

# DETAILED ENERGY AUDIT OF ELECTRICAL SYSTEMS & UTILITY EQUIPMENT

BY



**WIRE CONSULTANCY**  
ENGINEERING, RISK AND SUSTAINABILITY

FOR

CHAUDHARY CHARAN SINGH UNIVERSITY,  
MEERUT, UTTAR PRADESH



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<b>Study</b>	<b>Detailed Energy Audit of Electrical Systems &amp; Utility Equipment</b>
<b>Date of Site Visit</b>	<b>17<sup>th</sup>,18<sup>th</sup>, 19<sup>th</sup> &amp; 20<sup>th</sup> May 2022</b>
<b>Date of Submission</b>	<b>28<sup>th</sup> May 2022</b>
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### TABLE OF CONTENTS

1. ACKNOWLEDGEMENT .....	2
2. INTRODUCTION .....	3
3. SCOPE OF WORK.....	3
4. METHODOLOGY .....	4
5. SUMMARY OF ENERGY CONSERVATION OPPORTUNITIES (ECOS) SUGGESTED .	5
6. GENERAL DETAILS OF FACILITY .....	23
7. REVIEW OF ELECTRICITY BILLS CONTRACT, DEMAND AND POWER FACTOR ....	27
8. STUDY OF CAPACITOR PANEL .....	47
9. LOAD PROFILE OF THE FACILITY .....	50
10. STUDY OF POWER QUALITY .....	69
11. STUDY OF D.G. SETS .....	314
12. STUDY OF WATER PUMPS .....	323
13. STUDY OF CEILING, WALL & EXHAUST FANS: .....	332
14. STUDY OF CENTRALIZED ENERGY MONITORING SYSTEM STUDY OF ILLUMINATION.....	337
15. STUDY OF LIGHTNING AND ILLUMINATION .....	341
16. OTHER CONNECTED LOAD .....	365
17. ANNEXURE 1 RECOMMENDED LUX LEVELS .....	378
18. ANNEXURE 2 KVAR SELECTION CHART .....	380



## 1. ACKNOWLEDGEMENT

We are sincerely thankful to the CCS University, Meerut for their positive support in undertaking this intricate task of Energy Audit. The field studies would not have been completed on time without their interaction and timely support. We are grateful for their services and co-operation during field studies and data availability.

We feel highly privileged to be working for CCS University, Meerut and express our sincere thanks to **Mr. Vikas Tyagi and Mr. Sharad Giri** who pursued this essential measure for energy conservation. We also gratefully acknowledge their advice and direction provided to us from time to time.

We gratefully acknowledge the suggestion and cooperation provided to us by other supporting staff in obtaining required data from different sources.

Last but definitely not the least, we at WIRE CONSULTANCY, expresses our profound thanks to the electrical maintenance staff of CCS University, Meerut for their efforts & assistance extended to the auditing team.

**For Wire Consultancy**



## 2. INTRODUCTION

With the advent of energy crisis and exponential hikes in the costs of different forms of energy, Energy Audit is manifesting its due importance in every establishment. Energy Audit helps to understand more about the way energy is used in any Establishment and helps in identifying areas where waste may occur and scope for improvement exists.

It was with this objective that Wire consultancy was entrusted with the job of conducting Energy Audit of CCS University, Meerut, Uttar Pradesh

## 3. SCOPE OF WORK

- Review of Electricity Bills, Contract Demand and Power Factor: For the last one year, to explore the possibility of reducing the contract demand and improvement of Power Factor. Study of load, Loading Pattern etc.
- Review of present AC system like central AC, window AC, split AC, package AC, Water Coolers, and Air heaters etc.
- Power Quality study which includes harmonic analysis, power factor, load unbalancing, nominal voltage and current range etc.
- Illumination System: Study of the illumination system, lux level in various areas, area lighting and suggest measures for improvements and energy conservation opportunity wherever feasible.
- DG Set: Measurement of Specific Fuel Consumption in DG Sets and suggesting various measures for improvements.
- Transformer & distribution network: evaluation and loss calculations at transformer and distribution network.
- Review of lighting and fans provided in the lifts and use of lights in standby conditions.
- Study of auxiliary system including drives and air compressors.

The entire recommendations have been backed up with techno-economic calculations including the estimated investments required for implementation of the suggested measures and payback period. Measurements have been made using appropriate instrumentation support for time lapse and continuous recording of the operational parameters.



#### 4. METHODOLOGY

Methodology adopted for achieving the desired objectives viz: Assessment of the Current operational status and Energy savings include the following:

- Discussions with the concerned officials for identification of major areas of focus and other related systems.
- A team of engineers visited the Site and had discussions with the concerned officials/ supervisors to collect data/ information on the operations and Load Distribution within the Plant. The data was analyzed to arrive at a base line energy consumption pattern.
- Measurements and monitoring with the help of appropriate instruments including continuous and/ or time-lapse recording, as appropriate and visual observations were made to identify the energy usage pattern and losses in the system.
- Computation and in-depth analysis of the collected data, including utilization of computerized analysis and other techniques as appropriate were done to draw inferences and to evolve suitable energy conservation plan/s for improvements/ reduction in specific energy consumption.

#### INSTRUMENTATION SUPPORT

Some of the instruments used for undertaking the audit include the following:

Name of the Instrument (Make/ Model)	Primary Measured Parameters	Measuring Range	Accuracy	Resolution
Load Manager with appropriate CT's and Voltage Probes for HT & LT measurements (Krykard/ALM 31)	Active Power	0 – 9999 KW	± 1%	4-digit
	Reactive Power	0 – 9999 KVAR	± 1%	4-digit
	Power Factor	0.14 – 1	± 1.5%	0.001
Anemometer (Extech/ 45118)	Air Velocity	0.5 – 89 miles/hr.	± 3%	3½ digit LCD with multifunction indicators
Lux Meter (TES 1332)	Lux	0 to 200000 lux	± 3%	3½ digit LCD



Name of the Instrument (Make/ Model)	Primary Measured Parameters	Measuring Range	Accuracy	Resolution
Surface Temperature Indicator with appropriate Probe (CHY 501 K)	Temperature	-50°C to 450°C	± 0.3%	0.5°C
Water Flow Meter (TUF-2000H)	50MM – 750MM DIA.	14000M <sup>3</sup> /HRS.	± 1%	-30 <sup>0</sup> to 160 <sup>0</sup> C Temp.

### 5. SUMMARY OF ENERGY CONSERVATION OPPORTUNITIES (ECOS) SUGGESTED

- The Power Supply to the **Chaudhary Charan Singh University, Meerut** (CCS University, hereafter) is sourced from the PVVNL at 11 KV and stepped down through transformers 11/0.433KV subsequently.
- There are two energy meters installed in the university campus at 11 KV on behalf of UPPCL. **Meter No. XE498276** feeds to Sub-station A, and **Meter No. XE498270** feeds to Sub-station B, C and D. We have reviewed the power consumption of entire campus month wise. The campus is being billed on KVAH and maintains the Power factor the effect of power factor is inbuilt in electricity bills tariff. There are no capacitor panels installed at both the feeder; at LT distribution side after transformers. It is recommended install APFC panel of 450 KVAR with small units of 2 KVAR, 3 KVAR, 5 KVAR, 7.5 KVAR and 10 KVAR to maintain the power factor 0.999-1.00 at every load condition, so that the overall system power factor is maintained from the current recorded range 0.646-0.960 at meter number XE498276 and recorded from 0.274 to 0.840 at meter number XE498270. it is recommended that maintain the Power factor 0.99 and above at every load condition and above. For this purpose, it is suggested to install a new APFC panel in auto mode so that every time it can maintain the power factor automatically as per the requirement of the system. The estimated investment for new APFC panel of 450 KVAR for meter number: XE498276, is approx. Rs.8,00,000/- and cumalitive savings is Rs.4,64,680/- per year with the payback period of 1.75 years. For meter number: XE498270, the estimated investment for new APFC capacitor panel of 450 KVAR is approx. Rs. 8,00,000/- and cumalitive savings is Rs.78,07,765/- per year with the payback period of 2 months.



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



- **Study of D.G. Sets:** - CCS University has installed ten (10) number of D.G. sets of different capacity such as, 180 KVA, 250 KVA, 320 KVA, and 380 KVA at different location of the campus for power cut and self-generation. During the study team was check the fuel efficiency. Overall efficiency of the D.G. sets according to the running load was found satisfactory. For details, refer the chapter of study of D.G. sets.
- **Study of Water Pumps:** CCS University has installed ten (10) number of tube wells for drinking water and irrigation purpose at different location of the campus. The measurements and efficiency were calculated for tube wells and submersible and calculated the efficiency. On behalf of study, it is suggested replace old motor, which are burnt more than 4 times with energy efficient motors with the help of government bodies such as EESL.
- Voltage level also found very low at **Tapovan** tube wells. It is suggested to install small capacitors in direct mode just after contactor, to increase the voltage existing level **335 Volt. to 415 Volt**. It will also help to reduce the existing current level and will improve the power factor. Cost for installing capacitors for four (4) numbers of tube wells at **Tapovan** will be approx. Rs. 20,000/-
- **Study of fans and exhaust fans:** - Approx. 5266 number of ceiling fans of 50 W are installed in the entire university campus and approx. 3081 number of exhaust fans of 80 W were installed. It is suggested replace all existing fans and exhaust fans with the energy efficient 26-Watt BLDC fans. The approximate saving by replacing 5266 nos. of ceiling fans will be Rs.19,96,867/- per year with the investment of Rs.1,63,24,600/- and the payback period of this investment will be approx. 8.5 years. Savings by replacing 3081 number of 80-watt existing exhaust fans with 20-watt BLDC exhaust fans is approx. Rs. 29,20,788/- per year with the investment of Rs.83,18,700/- with the simple payback period of 3 years.
- **Lighting system:** - University campus has installed 70 sodium lights of 125-watt and approx. 8693 STL lights of 40-watt lights which could be replaced by 20-watt energy efficient LED lights. Savings by replacing existing 8693 number of 40-watt STL lights will be approx. 49,44,578/- per year. The replacement costs of those lights will be approx. Rs.17,38,600/- with the payback period of 3 months. Also, sodium lights could be replaced with 70-watt LED lights and savings by replacing these sodium lights will be approx. Rs.1,93,770/- with the investment of Rs.1,75,000/- with a simple payback period of within 2 months.





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



- Although there is no simpler way to reduce the amount of energy consumed by lighting system than to manually turn OFF whenever not needed, this is not done as often as it could be. In response, automatic lighting control strategies like installation of occupancy sensors can be considered to control light in response to the presence or absence of people in the space. Quantification of energy savings on this account is not possible. The management was already replaced most of the conventional with energy efficient LED light and is also keen to replace the pending conventional lights.
- Cumulative energy saving opportunities in KVAH & corresponding monetary benefits with simple payback period is tabulated below.

ECO's	Saving Quantum (KVAH)	Annual Energy Savings (Rs Lacs)	Estimated Investments (Rs Lacs)	Simple Payback Period (Months)
Improvement in the Overall System Power Factor Meter NO. XE498276	48525	4.646	8.0	21
Improvement in the Overall System Power Factor Meter NO. XE498270	815341	78.077	8.0	2
Saving by using 26W BLDC Ceiling fans (5266 numbers)	252768	19.968	163.246	102
Saving by using 20W BLDC Exhaust fans (3081 numbers)	369720	29.07	83.187	36
Saving by replacing 40 W STL with 20 W LED lights	625896	49.445	17.386	3
Saving by replacing 125 W sodium lights with 70 W LED lights	24528	1.937	1.75	2
<b>Grand Total</b>	<b>2136778</b>	<b>183.143</b>	<b>281.569</b>	<b>102 (max)</b>

- The summary of the power quality study at various feeders is tabulated below.



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
<b>Sub-station -A</b>																
Transformer 1000KVA, Output (SS-A)	405.63	412.88	407.83	567.1	393.33	545.4	49.9 8	326.8 1	355.2 6	0.91	1.2	1.3	1.2	3.2	2.4	2.7
Admin Block (SS-A)	414.45	415.65	408.55	112.71	89.79	103.35	49.9 2	71.49	72.9	0.98	1.3	1.4	1.2	3.8	4.8	3.7
Rani Laxmi Bai Hostel, Guest House, Dhan Singh Gujjar Hall and Railway counter (SS- A)	414.06	413.75	407.14	16.81	2.67	36.62	49.9 5	13.09	13.29	0.98	1.2	1.5	1.3	9.1	29.6	3.7
D G Set 250	414.94	414.51	415.89	210.62	205.09	196.98	50.3	142.2	146.9	0.83	3.4	2.7	3.5	12.1	13.9	9



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
KVA (SS-A)							5	2	7							
D.G. Set 180 KVA (SS-A)	424.65	417.57	413.62	87.5	133.74	181.55	51.2 6	94.94	97.22	0.91	1.6	1.9	1.9	76.1	16.6	15.1
Durga Bhabhi Hostel UG (SS-A)	406.43	408.78	409.53	5.63	17.82	7.51	49.9 2	6.94	7.29	0.94	1.3	1.4	1.2	5.4	5.1	7.2
Library Information Science (SS- A)	408.75	411.04	411.68	8.33	18.48	11.36	49.9 1	8.99	9.04	0.99	1.2	1.3	1.2	5.3	2.6	3.3
Old Over Head, Urdu and Hindi Dept. (SS-A)	412.39	412.21	409.69	21.7	18.05	6.37	50	8.28	10.96	0.57	1.4	1.3	1.3	17.9	25.6	293.4



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
Rani Laxmi Bai Hostel (SS-A)	408.71	411.58	410.87	16.52	8.93	43.08	50.0 1	15.76	16.27	0.96	1.3	1.3	1.3	11.1	9.8	7.4
New Girls Hostel (SS-A)	409.6	412.28	411.64	14.18	22.02	31.36	50.0 1	15.68	16.06	0.98	1.3	1.3	1.2	3.9	3.4	1.8
Durga Bhabhi Hostel Overhead (SS-A)	408.52	411.39	409.9	16.1	22.73	23.01	49.9 9	14.25	14.64	0.97	1.24	1.29	1.17	4.4	4.13	2.54
New Park	409	407.83	409.89	21.38	34.75	34.79	49.9 3	19.93	21.46	0.93	1.2	1.3	1.3	3.5	3.6	3.2
Zoology Dept. and Old Tube well (SS-A)	408.91	412.45	411.35	45.67	60.57	86.32	49.9 8	41.63	45.74	0.89	1.3	1.4	1.3	5.1	6.5	9.7



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
VC Office (SS-A)	412.11	409.4	412.59	25.5	53.55	7.43	49.9 9	19.91	20.54	0.97	1.2	1.3	1.4	16.6	6.2	29.3
Secrecy Exam. Dept. (SS-A)	411.79	411	418.67	22.37	15.33	13.74	50.0 1	8.43	12.3	0.68	2.4	2.6	1.3	7	14.9	18.3
Rani Laxmi Bai Hostel (SS-A)	419.79	422.02	419.46	3.79	31.19	26.97	50.0 2	14.82	15.07	0.98	1.3	1.3	1.3	7.7	13.8	4.3
Dara Singh Kushti Hall, MBA (SS-A)	418.12	422.73	417.98	47.1	46.57	52.83	49.9 9	23.5	35.5	0.65	1.3	1.3	1.4	4	5.1	4.5
Computer Centre and New Answer Book Hall (SS-	419.27	412.62	418.3	25.1	28.04	20.44	50	16.9	17.71	0.89	1.4	1.3	1.3	14.3	40.5	12



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
A)																
Auditorium, Main Gate and Security Office (SS-A)	417.95	410.61	416.76	7.65	1.65	9.18	49.9 4	4.35	4.43	0.98	1.3	1.2	1.3	8.1	22.6	11.4
M. Phill (SS-A)	414.76	414.73	408.13	25.34	15.43	18.77	49.9 2	11.55	14.17	0.77	1.2	1.4	1.3	20.2	69.3	23.2
D G Set 320 KVA (SS-A)	445.73	443.51	446.85	150.59	173.89	133.02	50.4 4	110.4	117.6 8	0.91	1.3	1	0.9	8.8	6.2	6.3
<b>Sub-station -B</b>																
Transformer 630 KVA, Output (SS-B)	414.16	410.07	413.91	267.74	452.14	350.39	50	231.9 4	254.9 6	0.87	1.4	1.4	1.4	3.8	2.1	3.9



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Power	Power	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.95	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
D.G. Set 380 KVA, (SS-B)	425.5	419.79	419.63	236.66	342.38	336.72	50.15	211.75	222.89	0.91	1.7	1.6	1.6	5.4	5.5	4.7
Transformer 630 KVA, Kendriya Mulyankan Bhawan (SS-B)	422.76	426.87	424.38	192.08	203.23	216.14	49.84	145.18	149.98	0.96	3.4	3.5	3.5	33	29.4	28.4
D.G. set 400 KVA, Kendriya Mulyankan Bhawan (SS-B)	413.68	412.63	412.25	104.96	131.65	132.73	50.07	86.51	88.04	0.94	3.8	3.5	3.5	24.7	16.5	20.5
History Law Substation-B,	415.59	415.81	417.01	30.87	23.94	21.08	50	17.35	18.25	0.97	2.8	2.8	3	10.2	14.2	20



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
Civil (SS-B)																
Examination Centre (SS-B)	408.52	400.18	399.44	16.83	46.65	47.36	49.9 8	22.11	25.72	0.83	2.8	2.8	2.8	28.4	10.5	11
KP Hostel, RK Hostel Panel 2nd (SS-B)	407.56	397.75	397.68	4.06	5.67	22.15	50.0 1	6.93	7.32	0.95	3	3.1	3.1	18.1	7.6	11.9
Farm House UG (SS-B)	396.75	398.45	410.42	36.94	5.71	10.85	49.9 9	12.39	12.5	0.99	3	3	2.9	5.2	10.2	8.3
Physics Dept. AC (SS-B)	396.53	409.71	394.67	18.27	6	25.59	50	11.06	11.5	0.9	3	2.9	3.1	21.4	19.1	15.8
Campus Farm OH, (SS-B)	401.41	412.54	401.49	27.07	8.15	3.78	50.0 3	8.81	9.04	0.95	3	2.8	2.9	5.3	8.3	8.2





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Power	Power	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.95	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
Brahaspati Bhawan, Horticulture Dept. (SS-B)	422.15	414.84	425.14	36.5	28.57	25.06	50	20.41	21.93	0.91	1.6	1.6	1.5	5.6	7.5	10.3
Canteen Library, Internet (SS-B)	415.23	424.37	420.13	51.72	22.47	70.04	49.98	33.24	35.02	0.91	1.5	1.3	1.5	17.4	20.3	10.4
KP Hostel, RK Hostel Panel 1st (SS-B)	419.97	414.2	423.39	32.38	52.99	36.34	50	28.01	29.41	0.95	1.4	1.3	1.3	4.8	3.1	3.4
SS-C, Farm Tank (SS-B)	422.89	415.74	425.49	46.95	34.64	50.97	50.03	27.22	32.28	0.84	1.5	1.4	1.4	3.1	7.4	3.9
Sociology, English,	420.02	412.51	423.12	124.38	117.45	80.98	50.05	73.26	77.94	0.46	1.7	1.5	1.5	9.2	24.6	46.6



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
Sewer Pumping Station, Physical Education (SS-B)																
DSW, Sports and Sanskrit (SS-B)	418.1	410.02	421.88	123.79	99.54	108.13	50.0 1	75.28	79.86	0.94	1.6	1.5	1.5	2.2	2.2	2.8
Physics, Chemistry, Microbiology Dept. (SS-B)	421.58	413	425.16	53.48	45.59	23.83	50.0 1	26.75	29.86	0.83	1.5	1.3	1.3	11.8	8	14.2
D.G. Set 180 KVA, (SS-B)	407.05	402.79	399.73	25.92	53.99	74.51	53.5 9	35.57	35.92	0.98	1.5	1.2	1.7	35.6	8.3	9.4



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
Lighting 1st Floor Kendriya Mulyankan Bhawan (SS- B)	417.8	421.89	419.5	5.97	7.2	5.38	49.6 6	4.42	4.5	0.98	3.3	3.3	3.4	12.3	4.4	9.5
Lighting 3rd Floor Kendriya Mulyankan Bhawan (SS- B)	419.59	423.84	421.49	4.11	9.77	5.38	49.7 9	4.35	4.7	0.12	3.5	3.3	3.4	25	92.2	78.5
Lighting 2nd Floor Kendriya Mulyankan Bhawan (SS- B)	423.09	427.05	424.83	9.01	7.03	16.94	49.9 1	7.96	8.1	0.98	3.3	3.2	3.4	10.3	6.8	9.2



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
AC Feeder Kendriya Mulyankan Bhawan (SS- B)	419.94	424.06	422.03	119.51	119.64	120.47	49.8 7	78.85	87.67	0.89	3.2	3.3	3.3	49	50	49.7
<b>Sub-station -C</b>																
Transformer Output -630 KVA (SS-C)	424.88	425.03	427.28	67.26	105.4	87.22	49.9 9	56.69	63.67	0.31	1.5	1.2	1.4	52	30.4	35.1
D G Set 380 KVA (SS-C)	412.91	409.57	410.26	81.06	139.91	148.91	51.0 2	85.66	87.73	0.9	1.6	2.2	2	14.5	16	40.4
Library, Workshop and New Hostel (SS-C)	394.01	396.87	393.66	55.17	43.13	28.93	49.9 8	28.61	28.99	0.99	1.6	2	2.1	4.5	4.2	7.6



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
Block Mechanical (SS-C)	399.59	400.26	393.1	51.62	43.93	40.15	50.0 1	31.03	31.16	0.99	1.5	2	2.1	5.4	6.8	8.8
Block-A, B and Admin Block (SS-C)	401.02	400.86	394	30.69	22.19	45.69	50	21.52	22.64	0.93	1.4	1.9	2	14.5	20.6	39.9
Water Tank and Sewer pumping station (SS-C)	401.45	401.28	394.67	20.97	29.87	20.54	50.0 1	14	16.47	0.85	1.4	1.9	2	3.5	6.2	4.4
Applied Science (SS- C)	399.9	393.32	400.01	16.58	27.24	13.04	49.9 8	6.88	13.05	0.52	1.9	2	1.4	18.1	11.3	39.3
Block-C and Horticulture	400.23	394.17	400.53	23.66	25.7	28.13	50.0 1	10.72	17.82	0.6	1.9	2.1	1.5	9.3	8.9	11.4



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Power	Power	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.95	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
(SS-C)																
APJ Abdul Kalam Hostel (SS-C)	401.43	395.61	400.89	25.88	17.14	14.58	50.04	13.09	13.32	0.98	2	2.1	1.5	3.6	7.9	6.4
<b>Sub-Station D</b>																
Outgoing transformer 630 KVA (SS-D)	412.47	414.48	415.27	127.75	181.16	115.8	49.99	99.46	101.51	0.96	1.1	1.2	1.2	3.9	5.2	4.4
D G Set 250 KVA (SS-D)	406.45	413.04	410.86	144.14	94.81	99.88	50.31	79.18	80.18	0.98	3	2.5	2.2	10.2	9.8	9.1
New Mass Communication Dept (SS-D)	414.16	413.99	412.18	12.47	12.68	7.81	50.01	7.76	7.87	0.97	1	1.1	1.1	14.8	10.4	12.3



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage -V1	Voltage -V2	Voltage -V3	Current -I1	Current -I2	Current -I3	Hz	Powe r	Powe r	PF	%THD -V1	%THD -V2	%THD -V3	%THD -I1	%THD -I2	%THD -I3
Permissible Limits	415±6%	415±6%	415±6%				50			>0.9 5	<5%	<5%	<5%	<20%	<20%	<20%
	V	V	V	A	A	A	Hz	kVA			%	%	%	%	%	%
New Hindi Dept (SS-D)	407.51	411.05	406.51	7.94	1.07	2.3	49.9 6	2.61	2.66	0.91	1	1.2	1	15.6	4.4	6.7
Zoology Dept. ground floor (SS-D)	408.3	411.81	407.63	80.94	18.05	48.66	49.9 4	34.25	34.82	0.98	1	1.1	1	4.5	10.8	4.9
Psychology dept. (SS-D)	412.65	415.74	411.54	36	43.61	34.93	50.0 4	27.21	27.35	0.99	0.9	0.8	0.8	10.1	7.1	5
VSMP Hostel (SS-D)	414.73	416.07	413.31	25.28	11.12	16.98	49.9 9	12.63	12.77	0.99	0.9	0.9	0.8	4.4	4.8	4.2
Pt. Deendayal Upadhyay Hostel (SS-D)	410.77	412.46	409.34	13.72	17.74	12.63	50.0 1	10.03	10.47	0.96	1.3	1.2	1.2	8.5	2.5	5.2

\*Red mark areas are troublesome areas.



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Power factor is low at various feeders and current harmonics at various feeders is also exceeding the limits. It is suggested to use active harmonics filter for the rectification of the same. The details are provided in the upcoming sections of the report.





## 6. GENERAL DETAILS OF FACILITY

### CONTACT DETAILS

<b>Brief description of Assignment</b>	Detailed Energy Audit of Electrical Systems & Utility Equipment.
<b>Name &amp; Address of the facility.</b>	Chaudhary Charan Singh University, Ramgarhi, Meerut, Uttar Pradesh
<b>Operational Days</b>	365 days
<b>Name of Contact Officer</b>	Mr. Vikas Tyagi (Electrical Engineer)
<b>Contact Number of the Officer</b>	+91-9897239187
<b>Small write up about the facility.</b>	<p>Chaudhary Charan Singh University (formerly, Meerut University) was established in 1965, to cater to the needs of higher education in western Uttar Pradesh. The University celebrated its silver jubilee in 1991. Presently, it is one of the premier educational institutions of the country encompassing a vast, beautiful and pollution-free campus which sprawls over 222 acres of land having vast playgrounds and experimental fields, botanical garden, rose garden with life-size statue of the late Prime Minister Ch. Charan Singh, Gymnasium, Indoor Stadium, well equipped Library, Hostels for both girls and boys, Administrative Block, Spacious Auditorium, Guest House, Community Center, Medical Center, Residential Quarters for faculty members and employees, Canteen, Bank and Post office. The teaching department belonging to different faculties, are housed in spacious buildings and have well-equipped laboratories and advanced facilities. The University also has a separate engineering college, which is currently offering courses leading to B.Tech. degree in several different branches of engineering.</p>



**RATED SPECIFICATIONS OF TRANSFORMERS**

Particulars	TR#1, S/S-A	TR#2, S/S-C	TR#3, S/S-B	TR#4, S/S-B (New)	TR#5, S/S-D
<b>Make</b>	Universal Power	Powertech Electric	Powertech Electric	ABB	Powertech Electric
<b>Rating</b>	1000 KVA	630 KVA	630 KVA	630 KVA	630 KVA
<b>Voltage Ratio</b>	11/0.433 KV	11/0.433 KV	11/0.433 KV	11/0.433 KV	11/0.433 KV
<b>Current Ratio</b>	52.6/1333 A	33.30/480 A	33.30/480 A	33.3/480 A	33.30/480 A
<b>% Impedance</b>	5.5%	4.78%	4.78%	4.78%	4.78
<b>Year of Manufacturing</b>	2004	2004	2004	2021	2004

**RATED SPECIFICATIONS OF D.G. SETS**

**At Substation A**

Particulars	D.G#1	D.G#2	D.G#3
<b>Make</b>	CUMMINS	CUMMINS/Kirloskar	CUMMINS
<b>Rating</b>	320KVA	180KVA	250KVA
<b>Voltage</b>	415	415	415
<b>Current</b>	445	250	347.5
<b>KW</b>	256	200	200
<b>KVA</b>	320	180	250
<b>PF</b>	0.80	0.80	0.80
<b>RPM</b>	1500	1500	1500

**At Substation B**



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Particulars	D.G#1	D.G#2	D.G#3
Make	CUMMINS	CUMMINS/Kirloskar	CUMMINS
Rating	380KVA	180KVA	400KVA
Voltage	415	415	415
Current	529	250	556
KW	304	200	320
KVA	380	180	400
PF	0.80	0.80	0.80
RPM	1500	1500	1500

**At Substation C**

Particulars	D.G#1
Make	CUMMINS
Rating	380KVA
Voltage	415
Current	529
KW	304
KVA	380
PF	0.80
RPM	1500

**At Substation D**

Particulars	D.G#1
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CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Particulars	D.G#1
Make	Kirloskar Greens
Rating	250KVA
Voltage	415
Current	347.5
KW	200
KVA	250
PF	0.80
RPM	1500



## 7. REVIEW OF ELECTRICITY BILLS CONTRACT, DEMAND AND POWER FACTOR

### PURCHASED POWER

The power supply to the Chaudhary Charan Singh University is sourced from PVVNL (Pashchimanchal Vidyut Vitran Nigam Limited at 11KV and stepped down through transformer of 11/0.433KV. Subsequently the voltage is directly feeded to the servo stabilizer and controlled through the same and further fed to the bus bar through the changeover between purchased power and generated captive power.

### POWER CONSUMPTION

Chaudhary Charan Singh University is sourced from PVVNL (Pashchimanchal Vidyut Vitran Nigam Limited) at 11KV and there are two energy meters installed at the university campus at 11 KV on behalf of UPPCL. Meter number: XE498276 feeds to the Sub-station A and Meter number: XE498270 feeds to the Sub-station B, C and D. We have analyzed and reviewed the power consumption of entire campus month wise. The campus is being billed on KVAH and maintains the power factor; the effect of power factor is inbuilt in electricity bills tariff.

### SELF-GENERATED POWER (DG SETS & SOLAR)

The campus has installed app ten DG Sets of different capacity 500 KVA, 180 KVA, 250 KVA, 320 KVA, 380 KVA at different locations of the campus according to the connected/running load for power generation during the power cut & testing only.

The campus has also installed 1250 KW solar system through net metering with UPPCL. The billing for solar system on KVAH bases. The effect of Solar system is inbuilt in the UPPCL billing.

### ENERGY BILL ANALYSIS FOR METER NO. XE498276 (SS-A)

JUNE 2021 to MAY 2022

Contract Demand, Billable & Billed Demand:

Sr. No.	Month	Connected Demand	Billable Demand	Billed Demand
1	Jun-21	777.773	583.330	185.2
2	Jul-21	777.773	583.330	253.8
3	Aug-21	777.773	583.330	355

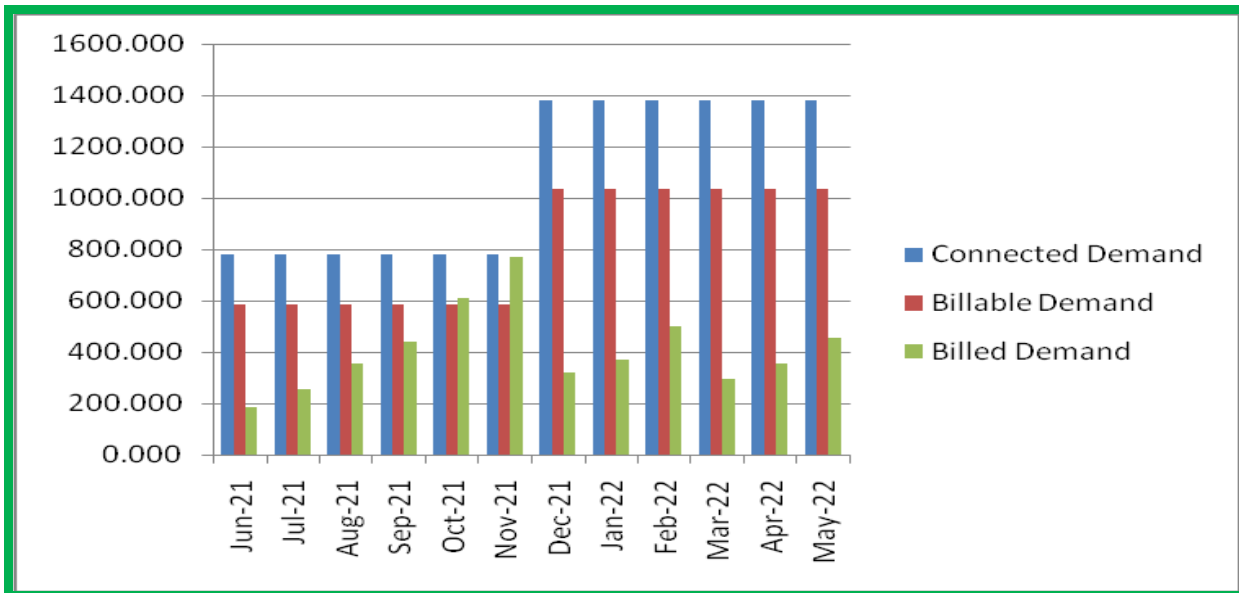


**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0  
28-05-2022



Sr. No.	Month	Connected Demand	Billable Demand	Billed Demand
4	Sep-21	777.773	583.330	439
5	Oct-21	777.773	583.330	611.4
6	Nov-21	777.773	583.330	768.3
7	Dec-21	1378.000	1033.500	322.2
8	Jan-22	1378.000	1033.500	369
9	Feb-22	1378.000	1033.500	501.9
10	Mar-22	1378.000	1033.500	296.1
11	Apr-22	1378.000	1033.500	353.1
12	May-22	1378.000	1033.500	457.5



**KWH & KVAH Variation:**

Sr. No.	Month	KWH	KVAH
1	Jun-21	51245	53730



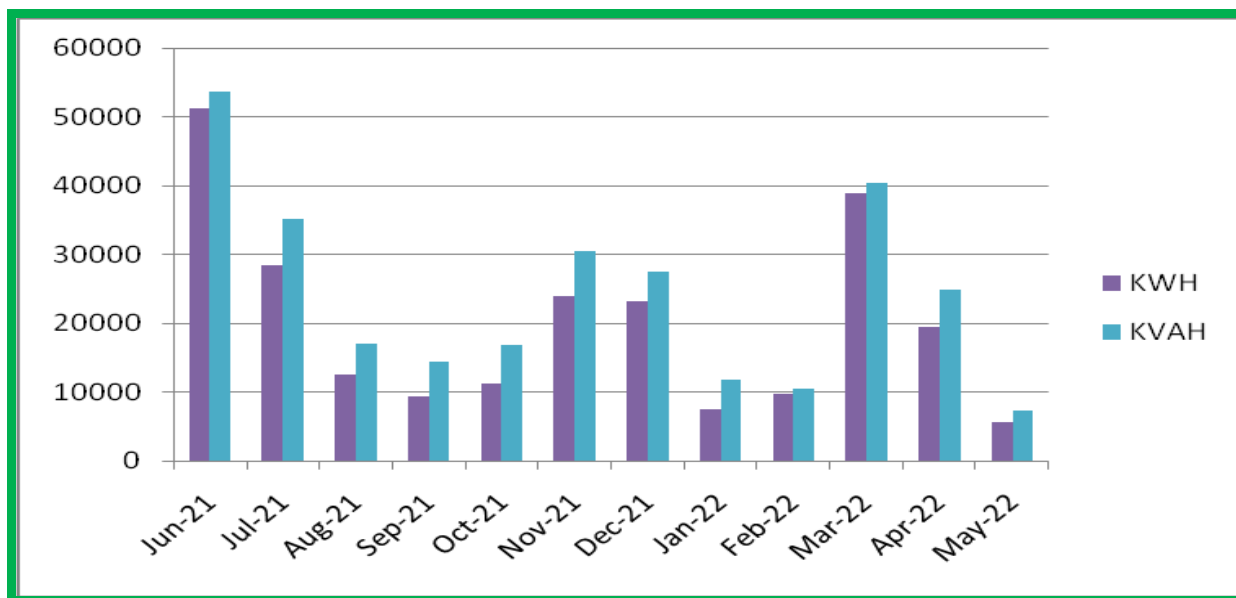
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ENERGY AUDIT

Rev 0

28-05-2022



Sr. No.	Month	KWH	KVAH
2	Jul-21	28450	35140
3	Aug-21	12590	16980
4	Sep-21	9270	14340
5	Oct-21	11242.5	16777.5
6	Nov-21	24000	30450
7	Dec-21	23100	27525
8	Jan-22	7402.5	11685
9	Feb-22	9637.5	10530
10	Mar-22	38812.5	40417.5
11	Apr-22	19410	24795
12	May-22	5692.5	7297.5
13	Total	240853	289668
14	AVG.	20071	24139



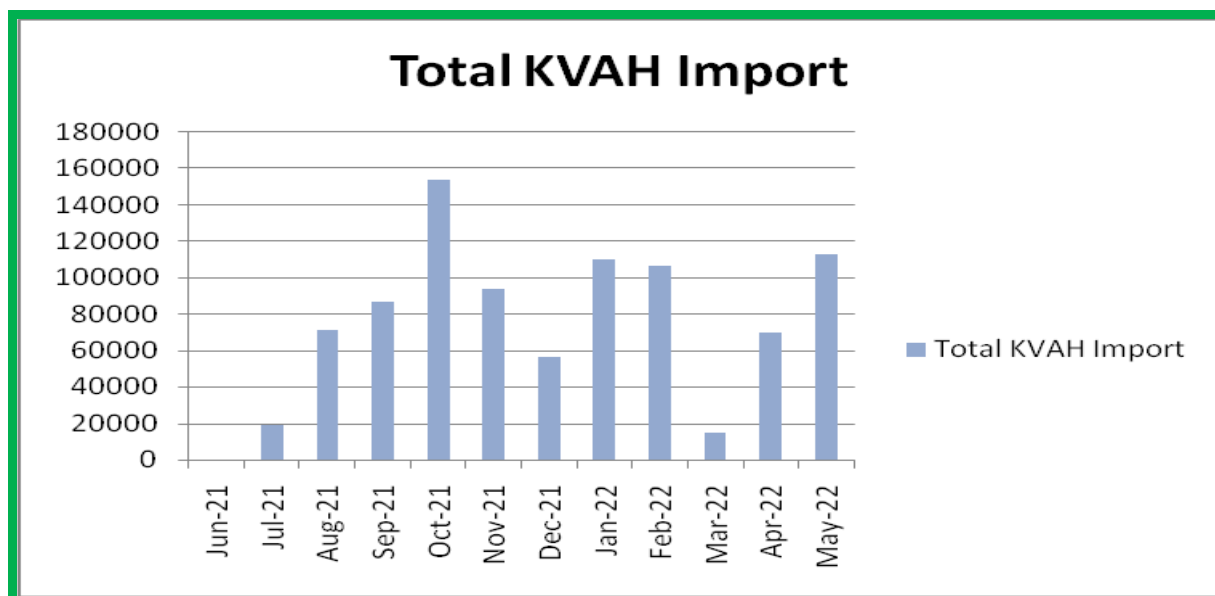
**Total KVAH Import**

Sr. No.	Month	Total KVAH Import
1	Jun-21	
2	Jul-21	19260
3	Aug-21	71620
4	Sep-21	86600
5	Oct-21	154200
6	Nov-21	93900
7	Dec-21	56580
8	Jan-22	110377.5
9	Feb-22	106867.5
10	Mar-22	14767.5
11	Apr-22	69750
12	May-22	112957.5





Sr. No.	Month	Total KVAH Import
13	Total	896880
14	AVG.	81534.545



**Power Factor Variation:**

Sr. No.	Month	PF
1	Jun-21	0.954
2	Jul-21	0.810
3	Aug-21	0.741
4	Sep-21	0.646
5	Oct-21	0.670
6	Nov-21	0.788
7	Dec-21	0.839
8	Jan-22	0.634



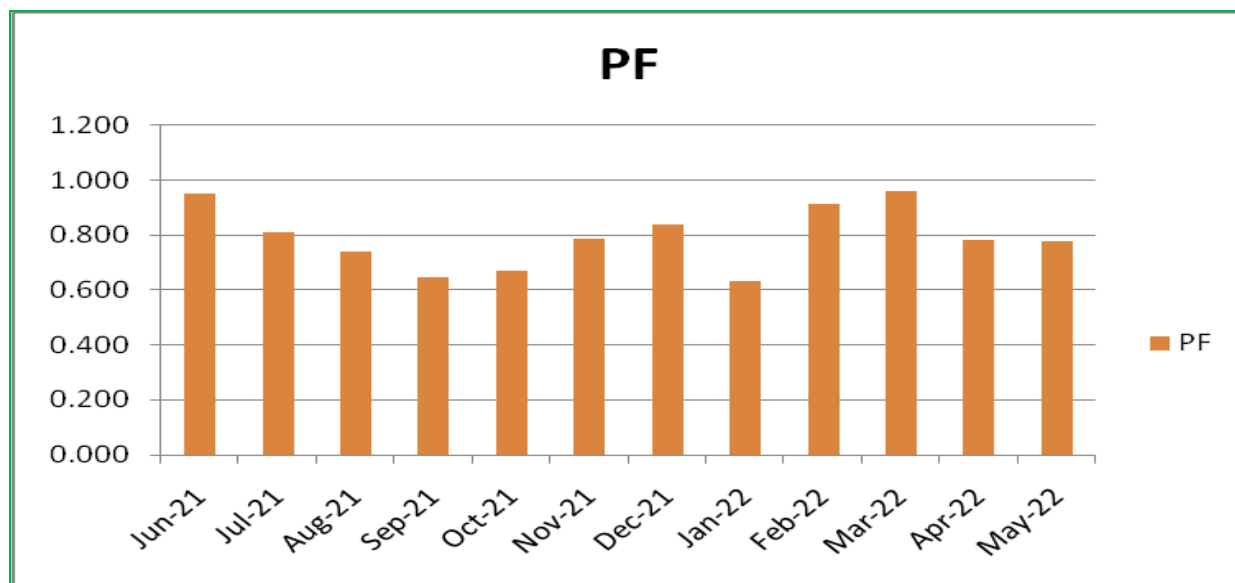
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ENERGY AUDIT

Rev 0

28-05-2022



Sr. No.	Month	PF
9	Feb-22	0.915
10	Mar-22	0.960
11	Apr-22	0.783
12	May-22	0.780
	AVG.	0.793





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



**OVERALL ENERGY BILL FOR METER NO. XE498276 (SS-A)**

Sr. No.	Month	Connected Demand	Billable Demand	Billed Demand	KWH	KVAH	PF	Total KVAH Import	Rs. For 2500/KVAH	Rs. For /KVAH	Total Amount Paid for KVAH	Demand Charge	Total Bill Paid
1	Jun-21	777.773	583.330	185.2	51245	53730	0.954					221665.36	238290.31
2	Jul-21	777.773	583.330	253.8	28450	35140	0.810	19260	19250	132404	151654	221665.36	429771.25
3	Aug-21	777.773	583.330	355	12590	16980	0.741	71620	19250	546048	565298	221665.36	847961.49
4	Sep-21	777.773	583.330	439	9270	14340	0.646	86600	19250	664390	683640	221665.36	973541.00
5	Oct-21	777.773	583.330	611.4	11242.5	16777.5	0.670	154200	19250	1198430	1217680	232332.00	1558763.00
6	Nov-21	777.773	583.330	768.3	24000	30450	0.788	93900	19250	722060	741310	291954.00	1110822.00
7	Dec-21	1378.000	1033.500	322.2	23100	27525	0.839	56580	19250	427232	446482	392730.00	904025.00
8	Jan-22	1378.000	1033.500	369	7402.5	11685	0.634	110377.5	19250	852232.25	871482.25	392730.00	1367534.00
9	Feb-22	1378.000	1033.500	501.9	9637.5	10530	0.915	106867.5	19250	824503.25	843753.25	392730.00	1339339.00
10	Mar-22	1378.000	1033.500	296.1	38812.5	40417.5	0.960	14767.5	19250	96913.25	116163.25	392730.00	547116.00
11	Apr-22	1378.000	1033.500	353.1	19410	24795	0.783	69750	19250	531275	550525	392730.00	1013999.00



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No.	Month	Connected Demand	Billable Demand	Billed Demand	KWH	KVAH	PF	Total KVAH Import	Rs. For 2500/KVAH	Rs. For /KVAH	Total Amount Paid for KVAH	Demand Charge	Total Bill Paid
12	May-22	1378.000	1033.500	457.5	5692.5	7297.5	0.780	112957.5	19250	872614.25	891864.25	392730.00	2405620.00
13	Total				240853	289668		896880	211750	6868102	7079852	3767327.45	12736782.05
14	AVG.				20071	24139	0.793	81534.545	19250.000	624372.91	7.9		14.20



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ENERGY AUDIT

Rev 0

28-05-2022



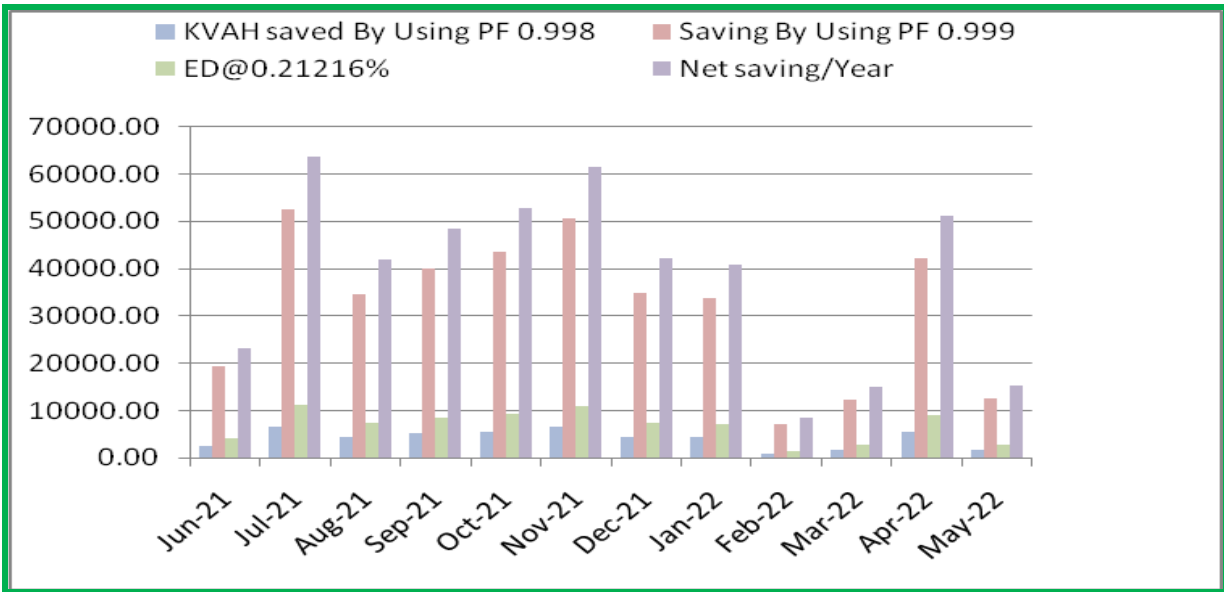
**Overall saving by using power factor 0.999 and above No. XE498276**

Sr. No.	Month	KVAH saved By Using PF 0.998	Saving By Using PF 0.999	ED@0.21216%	Net saving/Year
1	Jun-21	2431.27	19207.03	4074.96	23282.00
2	Jul-21	6654.86	52573.39	11153.97	63727.37
3	Aug-21	4373.02	34546.86	7329.46	41876.32
4	Sep-21	5055.66	39939.71	8473.61	48413.32
5	Oct-21	5518.22	43593.96	9248.89	52842.85
6	Nov-21	6419.55	50714.45	10759.58	61474.02
7	Dec-21	4397.48	34740.05	7370.45	42110.50
8	Jan-22	4270.82	33739.44	7158.16	40897.60
9	Feb-22	881.97	6967.56	1478.24	8445.80
10	Mar-22	1564.58	12360.20	2622.34	14982.54
11	Apr-22	5360.21	42345.62	8984.05	51329.67
12	May-22	1597.70	12621.85	2677.85	15299.70
13	Total	48525.33	383350.13	81331.56	464681.69
14	AVG.		31945.84	6777.63	38723.47



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ENERGY AUDIT

Rev 0  
28-05-2022





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



**ENERGY BILL ANALYSIS FOR METER NO. XE498270 (S/S-B, C and D)**

**JUNE 2021 TO MAY 2022**

**Connected, Billable & Billed Demand:**

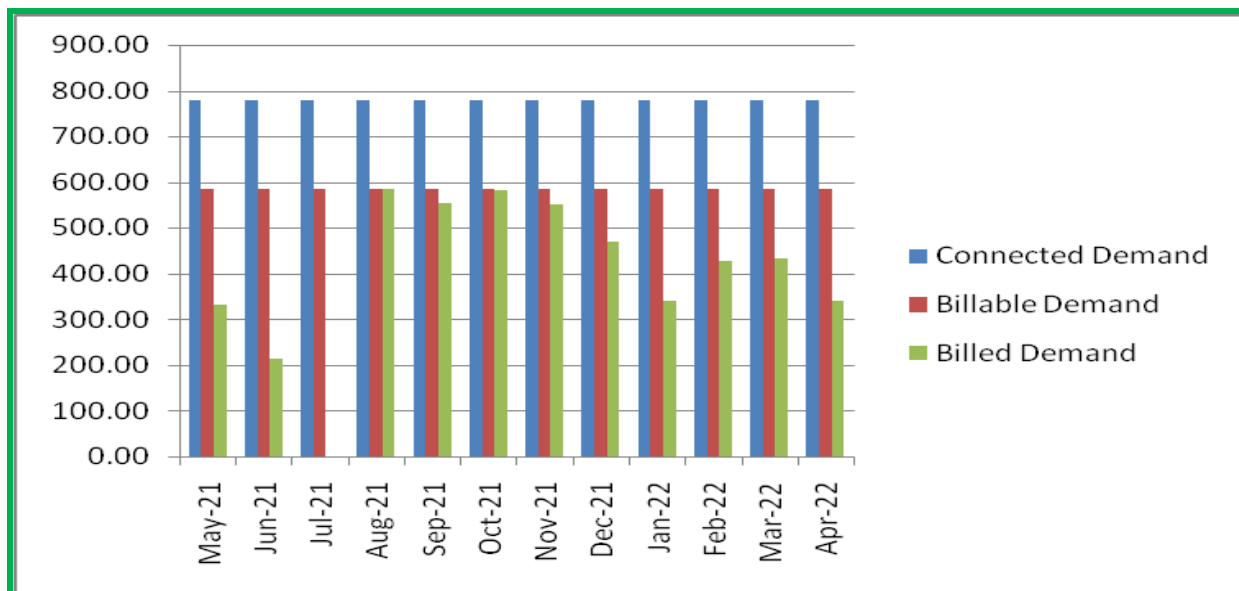
Sr. No.	Month	Connected Demand	Billable Demand	Billed Demand
1	May-21	778.89	584.170	330.6
2	Jun-21	778.89	584.170	212.6
3	Jul-21	778.89	584.170	
4	Aug-21	778.89	584.170	584.170
5	Sep-21	778.89	584.170	553.6
6	Oct-21	778.89	584.170	580.8
7	Nov-21	778.89	584.170	550.8
8	Dec-21	778.89	584.170	468.6
9	Jan-22	778.89	584.170	341
10	Feb-22	778.89	584.170	427.8
11	Mar-22	778.89	584.170	432.6
12	Apr-22	778.89	584.170	339.8



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ENERGY AUDIT

Rev 0

28-05-2022



**KWH & KVAH Variation:**

Sr. No.	Month	KWH	KVAH
1	May-21	8375	13220
2	Jun-21	12625	15025
3	Jul-21	1770	2470
4	Aug-21	225	800
5	Sep-21	425	995
6	Oct-21	130	475
7	Nov-21	2510	5830
8	Dec-21	2820	5745
9	Jan-22	110	530
10	Feb-22	230	460
11	Mar-22	1630	3545
12	Apr-22	3090	6410





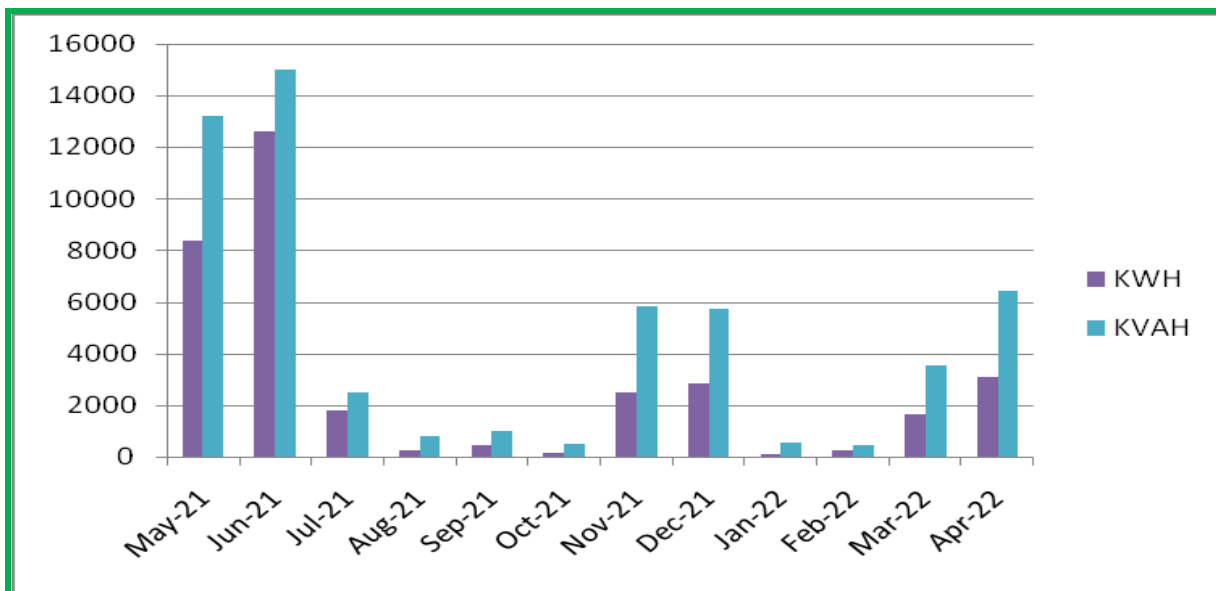
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**ENERGY AUDIT**

Rev 0

28-05-2022



Sr. No.	Month	KWH	KVAH
13	Total	33940	55505
14	AVG.	2828.333	4625.417

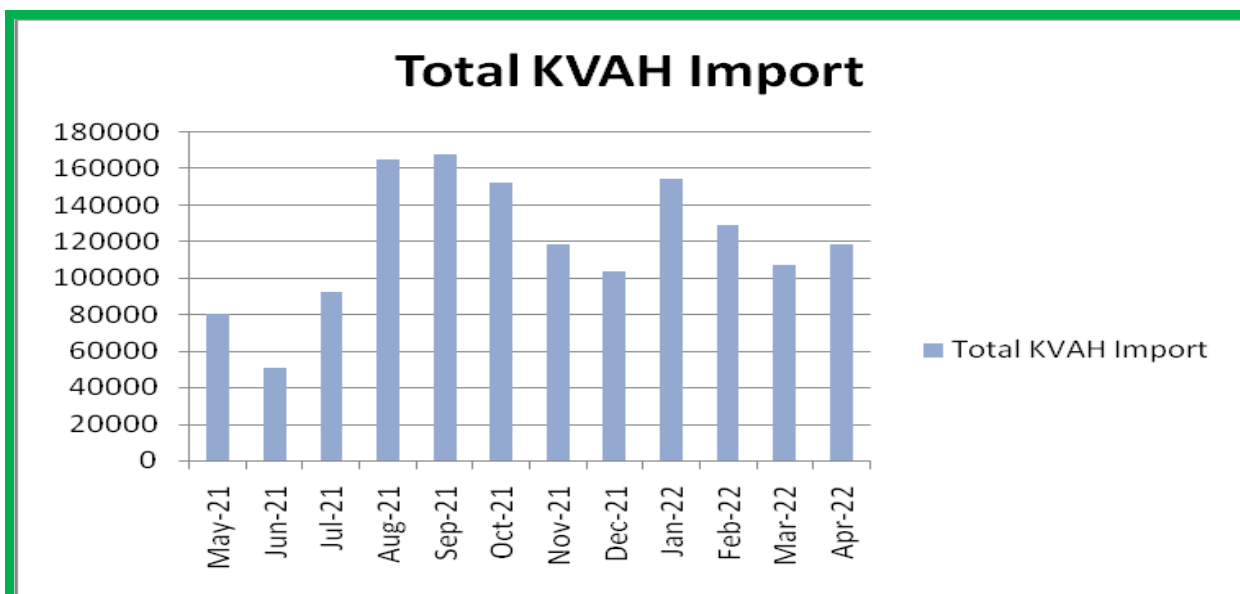


**TOTAL KVAH IMPORT**

Sr. No.	Month	Total KVAH Import
1	May-21	80410
2	Jun-21	50810
3	Jul-21	92350
4	Aug-21	165205
5	Sep-21	167835
6	Oct-21	152705
7	Nov-21	118650
8	Dec-21	104035



Sr. No.	Month	Total KVAH Import
9	Jan-22	154900
10	Feb-22	128985
11	Mar-22	107615
12	Apr-22	118380
13	Total	1441880
14	AVG.	120156.667



#### Charges Paid for the bill

Sr. No.	Month	Total Amount Paid for KVAH	Demand Charge
1	May-21	634739	221984.6
2	Jun-21	400899	221984.6
3	Jul-21	729065	221984.6
4	Aug-21	1304619.5	221984.6



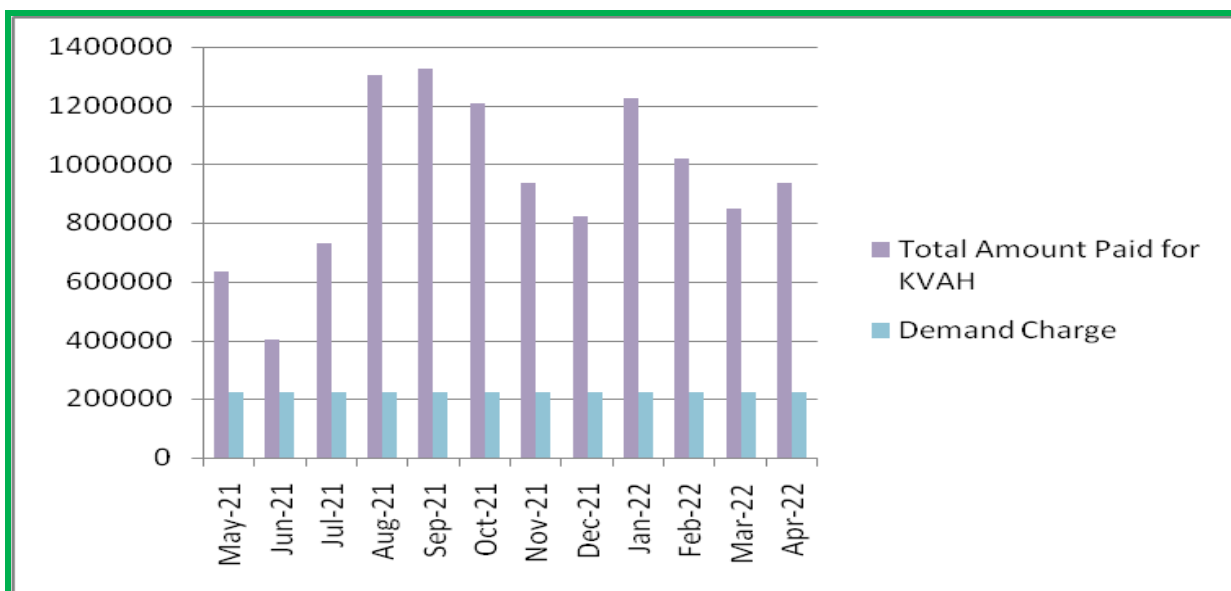
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ENERGY AUDIT

Rev 0

28-05-2022



Sr. No.	Month	Total Amount Paid for KVAH	Demand Charge
5	Sep-21	1325396.5	221984.6
6	Oct-21	1205869.5	221984.6
7	Nov-21	936835	221984.6
8	Dec-21	821376.5	221984.6
9	Jan-22	1223210	221984.6
10	Feb-22	1018481.5	221984.6
11	Mar-22	849658.5	221984.6
12	Apr-22	934702	221984.6
13	Total	11384852	2663815.09



**Power Factor Variation**

Sr. No.	Month	PF
1	May-21	0.634



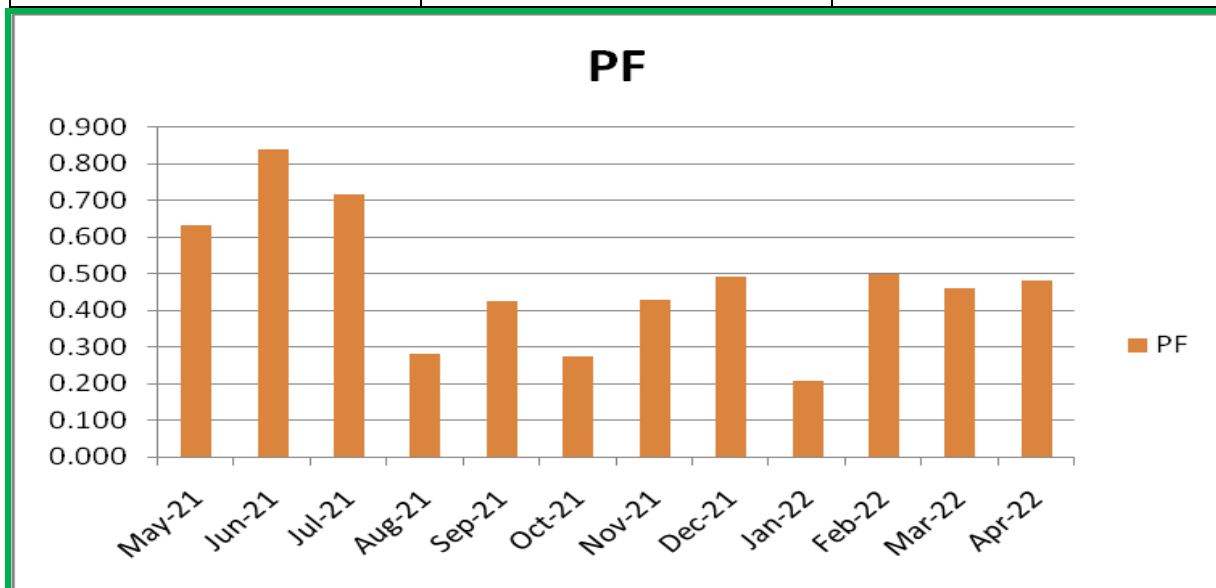
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ENERGY AUDIT

Rev 0

28-05-2022



Sr. No.	Month	PF
2	Jun-21	0.840
3	Jul-21	0.717
4	Aug-21	0.281
5	Sep-21	0.427
6	Oct-21	0.274
7	Nov-21	0.431
8	Dec-21	0.491
9	Jan-22	0.208
10	Feb-22	0.500
11	Mar-22	0.460
12	Apr-22	0.482
13	AVG.	0.479





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ENERGY AUDIT

Rev 0

28-05-2022



**OVERALL ENERGY BILL FOR METER NO. XE498270 (SS-B, C AND D)**

**JUNE 2021 TO MAY 2022**

Sr. No.	Month	Connected Demand	Billable Demand	Billed Demand	KWH	KVAH	PF	Total KVAH Import	Rs. For 2500/KVAH	Rs. For /KVAH	Total Amount Paid for KVAH	Demand Charge	Total Bill Paid
1	May-21	778.89	584.170	330.6	8375	13220	0.634	80410	19250	615489	634739	221984.6	921243.2
2	Jun-21	778.89	584.170	212.6	12625	15025	0.840	50810	19250	381649	400899	221984.6	669752
3	Jul-21	778.89	584.170		1770	2470	0.717	92350	19250	709815	729065	221984.6	1055147
4	Aug-21	778.89	584.170	584.170	225	800	0.281	165205	19250	1285369.5	1304619.5	221984.6	1631588.91
5	Sep-21	778.89	584.170	553.6	425	995	0.427	167835	19250	1306146.5	1325396.5	221984.6	1663459
6	Oct-21	778.89	584.170	580.8	130	475	0.274	152705	19250	1186619.5	1205869.5	221984.6	1534988.95
7	Nov-21	778.89	584.170	550.8	2510	5830	0.431	118650	19250	917585	936835	221984.6	1245839
8	Dec-21	778.89	584.170	468.6	2820	5745	0.491	104035	19250	802126.5	821376.5	221984.6	1121685
9	Jan-22	778.89	584.170	341	110	530	0.208	154900	19250	1203960	1223210	221984.6	1553625
10	Feb-22	778.89	584.170	427.8	230	460	0.500	128985	19250	999231.5	1018481.5	221984.6	1333532



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ENERGY AUDIT

Rev 0

28-05-2022



Sr. No.	Month	Connected Demand	Billable Demand	Billed Demand	KWH	KVAH	PF	Total KVAH Import	Rs. For 2500/KVAH	Rs. For /KVAH	Total Amount Paid for KVAH	Demand Charge	Total Bill Paid
11	Mar-22	778.89	584.170	432.6	1630	3545	0.460	107615	19250	830408.5	849658.5	221984.6	1152096
12	Apr-22	778.89	584.170	339.8	3090	6410	0.482	118380	19250	915452	934702	221984.6	1243525
13	Total				33940	55505		1441880	231000	11153852	11384852	2663815.09	15126481.06
14	AVG.				2828.333	4625.417	0.479	120156.667	19250.000	929487.67	7.9		10.49



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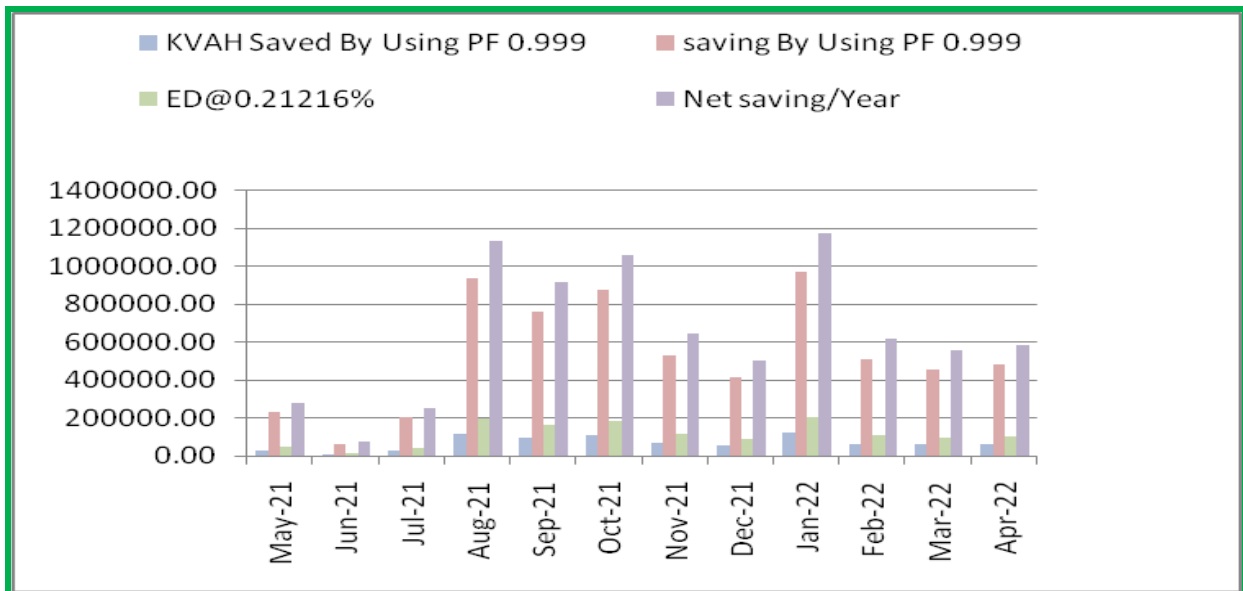
Rev 0

28-05-2022



**OVERALL SAVING BY USING POWER FACTOR 0.999 FOR METER NO. XE498270 (SS-B, C AND D)**

Sr. No.	Month	KVAH Saved by Using PF 0.999	saving By Using PF 0.999	ED@0.21216%	Net saving/Year
1	May-21	29389.06	232173.61	49257.95	281431.56
2	Jun-21	8065.26	63715.58	13517.90	77233.48
3	Jul-21	26079.71	206029.75	43711.27	249741.02
4	Aug-21	118575.89	936749.52	198740.78	1135490.30
5	Sep-21	95978.85	758232.90	160866.69	919099.60
6	Oct-21	110759.35	874998.85	185639.76	1060638.60
7	Nov-21	67448.76	532845.20	113048.44	645893.64
8	Dec-21	52864.18	417626.99	88603.74	506230.74
9	Jan-22	122596.04	968508.74	205478.81	1173987.56
10	Feb-22	64363.52	508471.77	107877.37	616349.14
11	Mar-22	58025.73	458403.30	97254.85	555658.15
12	Apr-22	61195.44	483443.99	102567.48	586011.47
13	Total	815341.80	6441200.21	1366565.04	7807765.25
14	AVG.	67945.15	536766.68	113880.42	650647.10



**Observations and Suggestions:**

- During the study of electricity bills from June 2021 to May 2022 of Meter NO. XE498276 (SS-A) it was found that the power factor level was running very lower side i.e. 0.646 to 960. It was also found the power factor level for Meter NO. XE498270 (SS-B,C and D) it was also running very low i.e. 0.274 to 0.840 which is very low. It should be 0.999 and 1.00 at every load condition.
- To maintain the power factor existing level to 0.999 or 1.00 at every load condition it is suggested install a power factor correction panel at both connections, so that it will able to maintain the power factor 0.999 and above.
- The investment to improve the power factor for of Meter NO. XE498276 (SS-A) are Rs.675000/- and for Meter NO. XE498270 (SS-B,C and D) are Rs.675000/-
- The billing is on KVAH basis, so there huge saving by using power factor 0.999.



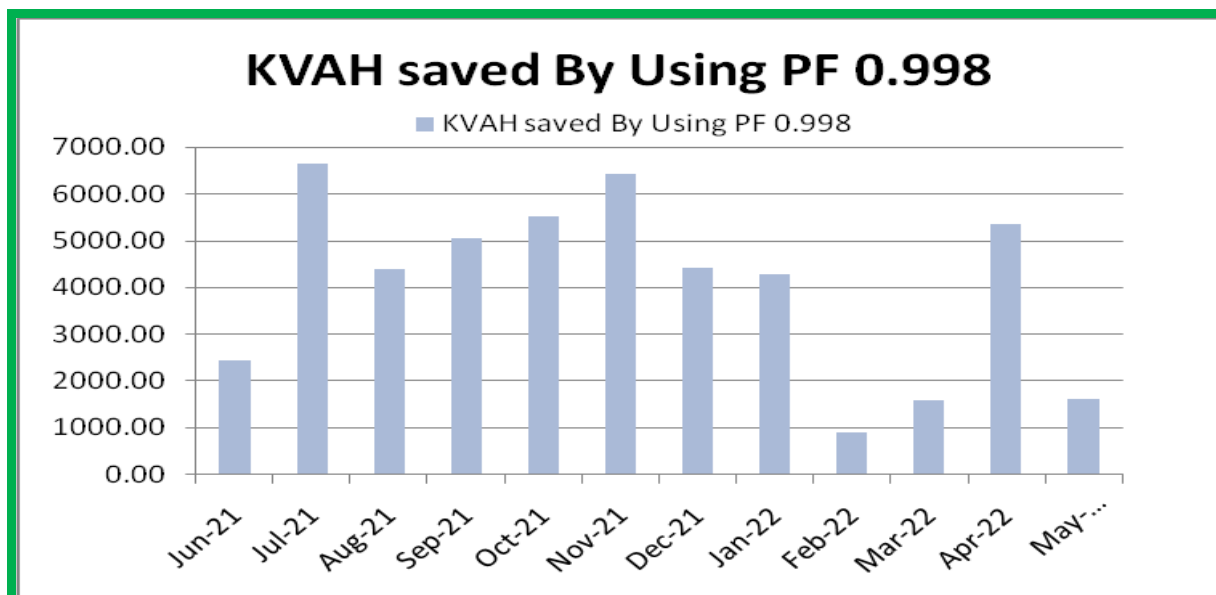


## 8. STUDY OF CAPACITOR PANEL

The campus has not installed any capacitor panel at both feeders. If we look at the overall average monthly electricity bills in last 12 months by campus for financial year 2021-22 power factor was mentioned in electricity bills billet on KVAH basis was given. The actual KVAR required to maintain the power factor from existing level to 0.999 and above for both two connections are 450 KVAR for each feeder. Details are given below.

### KVAH saved by installation of Capacitor Bank for Meter NO. XE498276

Sr. No.	Month	KVAH saved By Using PF 0.998
1	Jun-21	2431.27
2	Jul-21	6654.86
3	Aug-21	4373.02
4	Sep-21	5055.66
5	Oct-21	5518.22
6	Nov-21	6419.55
7	Dec-21	4397.48
8	Jan-22	4270.82
9	Feb-22	881.97
10	Mar-22	1564.58
11	Apr-22	5360.21
12	May-22	1597.70
13	Total	48525.33



- Total KVAH saved by installing capacitor panel is =48525 KVAH
- Capacitor panel is required to save above is =450 KVAR
- Cost for 450 KVAR APFC Capacitor panel is app. =Rs.675000/
- Erection, commissioning, testing and cable charges =Rs.125000/-
- Total Charges are = Rs.800000/-
- Payback within =1.75 Years.

**KVAH saved by installation of Capacitor Bank for Meter NO. XE498270**

Sr. No.	Month	KVAH Saved by Using PF 0.999
1	May-21	29389.06
2	Jun-21	8065.26
3	Jul-21	26079.71
4	Aug-21	118575.89
5	Sep-21	95978.85
6	Oct-21	110759.35
7	Nov-21	67448.76



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No.	Month	KVAH Saved by Using PF 0.999
8	Dec-21	52864.18
9	Jan-22	122596.04
10	Feb-22	64363.52
11	Mar-22	58025.73
12	Apr-22	61195.44
13	Total	815341.80
14	AVG.	67945.15

- Total KVAH saved by installing capacitor panel is app. =815340 KVAH
- Capacitor panel is required to save above is =450 KVAR
- Cost for 450 KVAR APFC Capacitor panel is app. =Rs.675000/-
- Erection, commissioning, testing and cable charges =Rs.125000/-
- Total Charges are =Rs.800000/-
- Payback within =2Months



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ENERGY AUDIT

Rev 0

28-05-2022



### 9. LOAD PROFILE OF THE FACILITY

Load profile at different feeders:

	Voltage- V1	Voltage- V2	Voltage- V3	Current- I1	Current- I2	Current- I3	Hz	Power KW	Power KVA	PF	%THD- V1	%THD- V2	%THD- V3	%THD- I1	%THD- I2	%THD- I3
<b>Sub-station -A</b>																
A1-For- Transformer 1000KVA, Output (SS-A)																
MIN	400.30	406.90	402.10	464.80	324.30	451.00	49.85	284.92	309.00	0.91	1.10	1.10	1.10	2.20	1.40	1.70
MAX	416.50	423.40	418.80	609.00	441.00	611.20	50.06	350.68	380.48	0.93	1.20	1.30	1.20	3.20	2.40	2.70
AVG	405.63	412.88	407.83	567.10	393.33	545.40	49.98	326.81	355.26	0.92	1.19	1.22	1.12	2.58	1.73	2.10
A2-For- Admin Block (SS-A)																
MIN	412.40	414.60	407.40	103.80	84.80	98.60	49.89	67.57	69.13	0.98	1.20	1.30	1.10	2.90	3.60	2.80
MAX	415.60	416.60	409.40	115.60	96.00	110.00	49.96	73.77	75.14	0.98	1.30	1.40	1.20	3.80	4.80	3.70
AVG	414.45	415.65	408.55	112.71	89.79	103.35	49.92	71.49	72.90	0.98	1.20	1.31	1.15	3.35	4.27	3.28
A3-For-Rani Laxmi Bai Hostel, Guest House, Dhan Singh Gujjar Hall and Railway counter (SS-A)																
MIN	411.70	411.90	405.20	16.71	2.62	36.16	49.90	12.97	13.17	0.98	1.20	1.30	1.10	7.70	27.60	2.40



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
MAX	416.00	415.40	408.30	16.91	2.80	50.85	49.98	16.44	16.71	0.99	1.20	1.50	1.30	9.10	29.60	3.70
AVG	414.06	413.75	407.14	16.81	2.67	36.62	49.95	13.09	13.29	0.98	1.20	1.34	1.20	8.46	28.19	2.99
A13-For-D. G Set 250 KVA (SS-A)																
MIN	400.50	410.00	404.10	75.20	46.80	64.10	47.42	45.93	49.44	0.83	1.40	1.30	1.10	3.10	3.70	2.70
MAX	422.40	417.00	422.70	251.70	276.20	234.70	51.11	161.98	167.10	0.97	3.40	2.70	3.50	12.10	13.90	9.00
AVG	414.94	414.51	415.89	210.62	205.09	196.98	50.35	142.22	146.97	0.97	2.37	1.76	2.45	3.70	4.78	4.40
B47-For-D.G. Set 180 KVA (SS-A)																
MIN	419.50	414.10	411.50	4.70	39.20	61.10	50.85	24.59	26.90	0.91	0.90	1.40	1.10	5.10	4.90	5.10
MAX	428.70	420.30	414.40	103.60	159.60	217.70	52.88	109.86	112.27	0.99	1.60	1.90	1.90	76.10	16.60	15.10
AVG	424.65	417.57	413.62	87.50	133.74	181.55	51.26	94.94	97.22	0.98	1.35	1.53	1.33	8.53	6.16	5.94
B1-For-Durga Bhabhi Hostel UG (SS-A)																
MIN	405.50	407.30	408.70	5.60	17.67	7.38	49.86	6.87	7.21	0.94	1.20	1.20	1.10	4.80	4.60	6.40
MAX	407.80	410.30	411.00	5.67	18.15	8.22	49.95	7.07	7.49	0.95	1.30	1.40	1.20	5.40	5.10	7.20



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
AVG	406.43	408.78	409.53	5.63	17.82	7.51	49.92	6.94	7.29	0.95	1.20	1.29	1.18	5.22	4.86	6.62
B2-For-Library Information Science (SS-A)																
MIN	407.00	409.10	410.10	8.30	18.43	11.34	49.85	8.95	8.99	0.99	1.20	1.20	1.10	5.00	2.40	3.20
MAX	410.40	412.90	413.20	8.35	18.62	11.37	49.99	9.04	9.09	1.00	1.20	1.30	1.20	5.30	2.60	3.30
AVG	408.75	411.04	411.68	8.33	18.48	11.36	49.91	8.99	9.04	0.99	1.20	1.29	1.14	5.17	2.51	3.23
B3-For-Old Over Head, Urdu and Hindi Dept. (SS-A)																
MIN	411.10	409.30	407.40	14.38	14.97	2.43	49.92	5.39	8.56	0.57	1.20	1.10	1.20	9.20	14.50	13.50
MAX	413.20	413.80	411.30	27.69	22.55	17.99	50.04	12.32	15.67	0.86	1.40	1.30	1.30	17.90	25.60	293.40
AVG	412.39	412.21	409.69	21.70	18.05	6.37	50.00	8.28	10.96	0.75	1.29	1.15	1.25	12.25	19.44	55.98
B4-For-Rani Laxmi Bai Hostel (SS-A)																
MIN	407.60	411.00	410.10	16.22	8.84	38.28	49.98	14.68	15.19	0.96	1.20	1.20	1.10	9.10	7.60	4.90
MAX	409.70	412.40	411.90	16.91	8.99	45.89	50.03	16.39	16.90	0.97	1.30	1.30	1.30	11.10	9.80	7.40
AVG	408.71	411.58	410.87	16.52	8.93	43.08	50.01	15.76	16.27	0.97	1.24	1.29	1.18	10.24	9.14	6.12



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
B5-For-New Girls Hostel (SS-A)																
MIN	408.00	411.20	410.00	13.25	20.86	31.15	49.96	15.44	15.84	0.98	1.20	1.20	1.10	3.00	2.80	1.30
MAX	410.50	413.00	412.60	14.57	23.15	31.74	50.06	15.96	16.35	0.98	1.30	1.30	1.20	3.90	3.40	1.80
AVG	409.60	412.28	411.64	14.18	22.02	31.36	50.01	15.68	16.06	0.98	1.27	1.28	1.16	3.35	3.10	1.57
B6-For-Durga Bhabhi Hostel Overhead (SS-A)																
MIN	407.70	410.50	409.10	15.76	18.68	22.70	49.95	13.23	13.69	0.97	1.20	1.20	1.10	4.30	3.50	2.40
MAX	409.60	412.20	410.60	16.44	24.40	23.20	50.04	14.69	15.07	0.98	1.30	1.30	1.30	4.50	5.60	2.70
AVG	408.52	411.39	409.90	16.10	22.73	23.01	49.99	14.25	14.64	0.97	1.24	1.29	1.17	4.40	4.13	2.54
B7-For-New Park																
MIN	407.80	406.70	408.00	21.23	34.59	34.55	49.91	19.88	21.42	0.93	1.10	1.20	1.20	3.30	3.40	3.10
MAX	410.50	408.90	411.20	21.50	35.01	35.02	49.99	20.01	21.53	0.93	1.20	1.30	1.30	3.50	3.60	3.20
AVG	409.00	407.83	409.89	21.38	34.75	34.79	49.93	19.93	21.46	0.93	1.20	1.23	1.27	3.41	3.50	3.12
B8-For-zoology Dept. and Old Tube well (SS-A)																



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**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
MIN	408.00	411.00	409.80	44.10	59.05	80.98	49.92	40.17	44.13	0.89	1.20	1.20	1.10	3.00	5.40	6.90
MAX	410.90	414.30	413.40	47.09	62.28	99.79	50.02	43.85	48.62	0.92	1.30	1.40	1.30	5.10	6.50	9.70
AVG	408.91	412.45	411.35	45.67	60.57	86.32	49.98	41.63	45.74	0.91	1.26	1.29	1.20	3.84	6.01	8.47
<b>B9-For-VC Office (SS-A)</b>																
MIN	411.00	408.20	411.80	24.37	52.18	7.05	49.96	19.29	19.93	0.97	1.10	1.20	1.20	10.80	3.30	20.20
MAX	413.30	411.70	413.60	29.93	56.94	7.77	50.02	21.50	22.12	0.97	1.20	1.30	1.40	16.60	6.20	29.30
AVG	412.11	409.40	412.59	25.50	53.55	7.43	49.99	19.91	20.54	0.97	1.19	1.23	1.29	13.79	4.49	24.13
<b>B10-For-Secrecy Exam. Dept. (SS-A)</b>																
MIN	399.80	398.40	417.30	20.77	14.96	11.27	49.98	8.19	11.82	0.68	1.20	1.20	1.20	5.70	11.50	12.70
MAX	417.30	417.50	420.30	22.62	15.78	14.47	50.04	8.65	12.65	0.70	2.40	2.60	1.30	7.00	14.90	18.30
AVG	411.79	411.00	418.67	22.37	15.33	13.74	50.01	8.43	12.30	0.69	1.57	1.53	1.28	6.17	13.37	13.81
<b>B11-For-Rani Laxmi Bai Hostel (SS-A)</b>																
MIN	417.70	419.80	416.90	3.76	29.63	25.92	49.96	14.40	14.65	0.98	1.10	1.20	1.20	6.90	9.80	3.70





**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
MAX	422.20	423.90	421.80	4.03	37.29	27.30	50.07	16.40	16.57	0.99	1.30	1.30	1.30	7.70	13.80	4.30
AVG	419.79	422.02	419.46	3.79	31.19	26.97	50.02	14.82	15.07	0.98	1.20	1.26	1.24	7.45	12.48	3.94
B12-For-Dara Singh Kushti Hall, MBA (SS-A)																
MIN	416.80	422.00	416.40	46.73	46.06	52.49	49.96	23.18	35.37	0.65	1.20	1.20	1.20	3.70	4.70	4.30
MAX	419.60	423.70	419.00	47.45	47.14	53.13	50.03	23.69	35.64	0.67	1.30	1.30	1.40	4.00	5.10	4.50
AVG	418.12	422.73	417.98	47.10	46.57	52.83	49.99	23.50	35.50	0.66	1.28	1.29	1.30	3.84	4.90	4.40
B13-For-Computer Center and New Answer Book Hall (SS-A)																
MIN	418.00	411.10	416.80	16.77	17.40	5.78	49.89	8.73	9.66	0.89	1.20	1.10	1.20	7.60	17.70	5.00
MAX	420.60	413.90	420.00	33.25	36.79	34.03	50.07	21.98	22.74	0.97	1.40	1.30	1.30	14.30	40.50	12.00
AVG	419.27	412.62	418.30	25.10	28.04	20.44	50.00	16.90	17.71	0.95	1.30	1.16	1.24	9.89	25.65	7.23
B14-For-Auditorium, Main Gate and Security Office (SS-A)																
MIN	416.90	409.70	414.30	7.63	1.49	9.11	49.90	4.29	4.39	0.98	1.20	1.10	1.20	6.10	17.90	10.20
MAX	419.00	411.90	417.90	7.67	1.72	9.23	49.98	4.38	4.46	0.98	1.30	1.20	1.30	8.10	22.60	11.40



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
AVG	417.95	410.61	416.76	7.65	1.65	9.18	49.94	4.35	4.43	0.98	1.29	1.17	1.21	7.23	19.50	10.88
B15-For-M-Phill (SS-A)																
MIN	412.80	412.40	405.50	23.70	14.37	16.41	49.86	10.11	13.21	0.77	1.20	1.30	1.20	13.10	42.60	16.20
MAX	416.80	416.20	410.10	34.91	20.24	20.83	49.98	14.66	16.52	0.88	1.20	1.40	1.30	20.20	69.30	23.20
AVG	414.76	414.73	408.13	25.34	15.43	18.77	49.92	11.55	14.17	0.81	1.20	1.31	1.20	17.43	62.23	19.01
A12-For-D. G Set 320 KVA (SS-A)																
MIN	443.60	442.70	442.60	67.30	83.60	82.40	50.26	55.80	60.45	0.91	0.50	0.40	0.40	3.50	3.00	2.70
MAX	448.20	444.60	450.10	190.90	207.60	175.40	50.84	135.61	142.26	0.96	1.30	1.00	0.90	8.80	6.20	6.30
AVG	445.73	443.51	446.85	150.59	173.89	133.02	50.44	110.40	117.68	0.94	0.63	0.53	0.57	4.53	3.63	4.73
<b>Sub-station -B</b>																
A5-For-Transformer 630 KVA, Output (SS-B)																
MIN	409.80	405.40	409.90	165.40	303.60	203.60	49.92	141.15	162.25	0.87	1.20	1.20	1.10	1.30	0.80	1.40
MAX	419.20	415.50	419.20	409.90	637.20	489.20	50.06	338.81	362.68	0.94	1.40	1.40	1.40	3.80	2.10	3.90



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
AVG	414.16	410.07	413.91	267.74	452.14	350.39	50.00	231.94	254.96	0.91	1.28	1.28	1.28	2.29	1.28	2.06
A6-For-D.G. Set 380 KVA, (SS-B)																
MIN	422.40	417.70	418.80	127.60	182.30	184.00	49.95	109.67	119.95	0.91	0.70	1.00	0.60	3.20	2.90	2.30
MAX	431.30	422.30	420.30	320.50	437.80	484.80	50.53	281.16	295.93	0.96	1.70	1.60	1.60	5.40	5.50	4.70
AVG	425.50	419.79	419.63	236.66	342.38	336.72	50.15	211.75	222.89	0.95	1.34	1.33	1.10	3.94	3.48	2.85
A7-For-Transformer 630 KVA, Kendriya Mulyankan Bhawan (SS-B)																
MIN	417.40	421.20	419.00	157.70	184.30	195.10	49.63	132.53	137.98	0.96	2.90	2.90	2.90	23.30	18.50	18.30
MAX	428.60	432.80	430.10	219.20	224.10	243.90	50.03	157.86	162.86	0.98	3.40	3.50	3.50	33.00	29.40	28.40
AVG	422.76	426.87	424.38	192.08	203.23	216.14	49.84	145.18	149.98	0.97	3.17	3.20	3.26	27.64	26.06	25.03
A8-For-D.G. set 400 KVA, Kendriya Mulyankan Bhawan (SS-B)																
MIN	412.60	411.40	410.00	34.40	51.90	50.90	50.06	31.93	33.97	0.94	1.00	0.90	1.00	11.60	6.80	10.40
MAX	415.30	415.60	414.70	146.30	168.30	182.50	50.07	116.45	118.09	0.99	3.80	3.50	3.50	24.70	16.50	20.50
AVG	413.68	412.63	412.25	104.96	131.65	132.73	50.07	86.51	88.04	0.98	2.53	2.39	2.41	17.35	13.14	13.96



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
B23-For-History Law Substation-B, Civil (SS-B)																
MIN	413.10	412.80	413.30	30.26	23.02	17.20	49.94	16.05	17.21	0.93	2.70	2.60	2.80	9.80	10.90	14.50
MAX	417.90	419.00	419.40	31.48	27.87	22.50	50.04	18.75	19.32	0.97	2.80	2.80	3.00	10.20	14.20	20.00
AVG	415.59	415.81	417.01	30.87	23.94	21.08	50.00	17.35	18.25	0.95	2.72	2.73	2.89	9.99	13.28	16.04
B24-For- Examination Centre (SS-B)																
MIN	407.40	397.00	396.20	13.42	39.65	38.79	49.95	18.57	22.41	0.83	2.50	2.50	2.50	18.60	6.90	7.90
MAX	409.90	402.10	401.50	17.75	56.34	58.01	50.04	26.04	29.51	0.88	2.80	2.80	2.80	28.40	10.50	11.00
AVG	408.52	400.18	399.44	16.83	46.65	47.36	49.98	22.11	25.72	0.86	2.59	2.60	2.64	20.69	8.67	9.25
B25-For-KP Hostel, RK Hostel Panel 2nd (SS-B)																
MIN	407.00	394.70	394.40	3.61	5.50	20.97	49.99	6.69	7.12	0.93	2.70	2.70	2.70	10.10	6.40	9.50
MAX	408.30	399.60	399.80	6.12	5.94	23.73	50.04	7.34	7.75	0.95	3.00	3.10	3.10	18.10	7.60	11.90
AVG	407.56	397.75	397.68	4.06	5.67	22.15	50.01	6.93	7.32	0.95	2.87	2.89	2.92	15.74	7.10	10.50
B26-For-Farm House UG (SS-B)																



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
MIN	391.10	393.60	407.30	29.66	5.28	10.12	49.95	10.87	10.99	0.99	2.60	2.70	2.60	3.40	6.50	7.00
MAX	399.10	401.20	412.40	44.53	6.40	11.37	50.03	13.94	14.03	0.99	3.00	3.00	2.90	5.20	10.20	8.30
AVG	396.75	398.45	410.42	36.94	5.71	10.85	49.99	12.39	12.50	0.99	2.72	2.80	2.75	4.28	8.30	7.67
B27-For-Physics Dept. AC (SS-B)																
MIN	391.80	408.60	391.10	18.13	1.43	18.70	49.95	8.42	8.80	0.90	2.60	2.50	2.60	12.80	4.60	9.70
MAX	398.90	410.80	398.10	18.45	15.24	26.77	50.04	13.40	13.98	0.97	3.00	2.90	3.10	21.40	19.10	15.80
AVG	396.53	409.71	394.67	18.27	6.00	25.59	50.00	11.06	11.50	0.96	2.77	2.62	2.72	16.98	12.53	11.49
B28-For-Campus Farm OH, (SS-B)																
MIN	394.60	410.50	394.40	20.58	6.67	3.25	49.96	7.09	7.36	0.95	2.30	2.20	2.20	3.40	3.90	3.70
MAX	403.70	414.00	404.00	36.99	9.51	5.25	50.08	11.30	11.47	0.99	3.00	2.80	2.90	5.30	8.30	8.20
AVG	401.41	412.54	401.49	27.07	8.15	3.78	50.03	8.81	9.04	0.97	2.68	2.52	2.55	4.16	6.09	6.91
B29-For-Brahaspati Bhawan, Horticulture Dept. (SS-B)																
MIN	417.70	412.10	423.20	24.53	22.77	13.66	49.97	14.32	15.48	0.91	1.40	1.40	1.30	2.40	2.80	4.70



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
MAX	424.50	418.00	426.60	58.06	34.78	38.29	50.04	29.60	31.34	0.95	1.60	1.60	1.50	5.60	7.50	10.30
AVG	422.15	414.84	425.14	36.50	28.57	25.06	50.00	20.41	21.93	0.93	1.49	1.45	1.39	4.41	4.86	7.60
B30-For-Canteen Library, Internet (SS-B)																
MIN	413.70	422.30	417.90	41.10	13.30	59.38	49.94	25.10	27.64	0.91	1.20	1.10	1.30	12.90	9.70	7.50
MAX	419.50	429.30	423.90	55.73	26.47	74.55	50.02	36.61	38.29	0.96	1.50	1.30	1.50	17.40	20.30	10.40
AVG	415.23	424.37	420.13	51.72	22.47	70.04	49.98	33.24	35.02	0.95	1.37	1.27	1.36	14.07	12.38	8.43
B31-For-KP Hostel, RK Hostel Panel 1st (SS-B)																
MIN	418.30	412.30	420.80	31.82	47.17	34.64	49.94	26.31	27.73	0.95	1.30	1.20	1.10	4.30	2.10	2.50
MAX	421.60	416.70	425.80	32.91	59.70	43.73	50.07	30.57	31.91	0.96	1.40	1.30	1.30	4.80	3.10	3.40
AVG	419.97	414.20	423.39	32.38	52.99	36.34	50.00	28.01	29.41	0.95	1.31	1.24	1.25	4.54	2.51	3.07
B32-For-SS-C, Farm Tank (SS-B)																
MIN	417.60	410.00	424.30	45.92	32.67	50.07	49.98	27.13	32.07	0.84	1.20	1.20	1.10	2.70	5.60	3.30
MAX	425.40	418.30	427.10	49.18	35.68	52.90	50.07	27.35	32.43	0.85	1.50	1.40	1.40	3.10	7.40	3.90



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
AVG	422.89	415.74	425.49	46.95	34.64	50.97	50.03	27.22	32.28	0.84	1.37	1.28	1.30	2.82	6.18	3.48
B33-For-Sociology, English, Sewer Pumping Station, Physical Education (SS-B)																
MIN	414.90	407.60	419.60	45.90	17.60	22.20	50.02	20.15	22.32	0.46	1.30	1.20	1.20	1.10	1.600	1.40
MAX	424.10	416.20	425.90	286.90	249.30	123.60	50.07	124.68	132.56	0.99	1.70	1.50	1.50	9.20	24.60	46.60
AVG	420.02	412.51	423.12	124.38	117.45	80.98	50.05	73.26	77.94	0.93	1.44	1.38	1.32	4.07	5.52	5.18
B34-For-DSW, Sports and Sanskrit (SS-B)																
MIN	415.70	407.70	420.10	117.00	98.50	103.00	49.97	72.37	77.03	0.94	1.40	1.30	1.20	1.60	1.90	2.00
MAX	423.00	414.30	424.60	141.10	101.50	111.30	50.04	80.04	84.86	0.95	1.60	1.50	1.50	2.20	2.20	2.80
AVG	418.10	410.02	421.88	123.79	99.54	108.13	50.01	75.28	79.86	0.94	1.50	1.39	1.37	2.03	2.09	2.37
B35-For-Physics, Chemistry, Microbiology Dept. (SS-B)																
MIN	420.70	412.10	424.50	41.85	40.27	19.72	49.96	20.72	24.84	0.83	1.40	1.20	1.20	7.40	5.60	6.90
MAX	422.40	413.70	426.00	61.80	52.08	29.20	50.04	30.97	33.66	0.92	1.50	1.30	1.30	11.80	8.00	14.20
AVG	421.58	413.00	425.16	53.48	45.59	23.83	50.01	26.75	29.86	0.89	1.40	1.27	1.23	8.89	6.81	10.18



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
B36-For-D.G. Set 180 KVA, (SS-B)																
MIN	404.60	400.90	397.70	7.90	37.30	56.90	53.45	28.57	29.22	0.98	1.30	1.00	1.50	12.10	4.10	6.80
MAX	409.50	404.50	402.20	31.40	77.40	91.10	53.76	41.82	42.16	0.99	1.50	1.20	1.70	35.60	8.30	9.40
AVG	407.05	402.79	399.73	25.92	53.99	74.51	53.59	35.57	35.92	0.99	1.41	1.09	1.59	14.43	6.00	7.82
B37-For-Lighting 1st Floor Kendriya Mulyankan Bhawan (SS-B)																
MIN	417.00	421.00	418.80	5.70	6.80	4.80	49.62	4.12	4.19	0.98	3.10	3.20	3.20	10.10	3.60	8.50
MAX	419.50	423.50	421.30	6.88	8.55	6.73	49.71	5.28	5.36	0.99	3.30	3.30	3.40	12.30	4.40	9.50
AVG	417.80	421.89	419.50	5.97	7.20	5.38	49.66	4.42	4.50	0.98	3.23	3.28	3.31	11.69	4.16	8.90
B38-For-Lighting 3rd Floor Kendriya Mulyankan Bhawan (SS-B)																
MIN	417.60	421.80	419.40	3.08	3.28	3.01	49.65	0.76	3.97	0.12	3.20	3.10	3.20	5.60	6.60	7.00
MAX	423.10	427.10	424.60	19.51	14.02	18.73	49.92	7.88	10.15	0.98	3.50	3.30	3.40	25.00	92.20	78.50
AVG	419.59	423.84	421.49	4.11	9.77	5.38	49.79	4.35	4.70	0.94	3.25	3.23	3.32	8.38	11.64	25.11
B39-For-Lighting 2nd Floor Kendriya Mulyankan Bhawan (SS-B)																





**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
MIN	421.70	425.30	422.60	8.97	7.01	14.66	49.89	7.39	7.53	0.98	3.20	3.20	3.20	10.10	6.60	7.00
MAX	423.80	427.60	425.30	9.05	7.04	21.58	49.94	9.11	9.24	0.99	3.30	3.20	3.40	10.30	6.80	9.20
AVG	423.09	427.05	424.83	9.01	7.03	16.94	49.91	7.96	8.10	0.98	3.21	3.20	3.29	10.17	6.68	7.55
B40-For-AC Feeder Kendriya Mulyankan Bhawan (SS-B)																
MIN	417.60	422.40	420.20	112.30	112.50	113.30	49.81	73.23	82.30	0.89	3.00	2.90	3.00	43.30	44.30	43.80
MAX	422.50	426.60	424.30	133.10	133.30	134.10	49.93	89.35	97.85	0.91	3.20	3.30	3.30	49.00	50.00	49.70
AVG	419.94	424.06	422.03	119.51	119.64	120.47	49.87	78.85	87.67	0.90	3.06	3.04	3.13	46.83	47.78	47.45
<b>Sub-station -C</b>																
A4-For- Transformer Output -630 KVA (SS-C)																
MIN	419.40	418.70	421.70	37.00	38.30	30.30	49.91	9.57	28.23	0.31	1.30	1.00	1.30	12.00	6.40	5.60
MAX	432.40	433.10	435.50	139.00	177.80	182.20	50.08	119.65	120.52	0.99	1.50	1.20	1.40	52.00	30.40	35.10
AVG	424.88	425.03	427.28	67.26	105.40	87.22	49.99	56.69	63.67	0.82	1.38	1.09	1.35	32.55	12.60	16.10
A11-For-D G Set 380 KVA (SS-C)																



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
MIN	412.30	408.30	409.20	46.20	65.40	66.30	50.93	39.47	43.60	0.90	0.90	1.40	1.20	5.50	5.20	8.50
MAX	413.40	411.80	413.70	101.10	170.20	167.40	51.32	99.10	100.87	0.98	1.60	2.20	2.00	14.50	16.00	40.40
AVG	412.91	409.57	410.26	81.06	139.91	148.91	51.02	85.66	87.73	0.97	1.01	1.56	1.44	7.14	6.87	11.51
B16-For-Library, Workshop and New Hostel (SS-C)																
MIN	391.70	394.50	391.80	53.91	42.22	25.59	49.90	27.78	28.16	0.99	1.40	1.80	1.90	3.90	3.60	6.20
MAX	398.40	400.10	394.90	56.64	43.53	29.85	50.04	29.00	29.37	0.99	1.60	2.00	2.10	4.50	4.20	7.60
AVG	394.01	396.87	393.66	55.17	43.13	28.93	49.98	28.61	28.99	0.99	1.50	1.92	1.97	4.21	3.86	6.67
B17-For-D-Block Mechanical (SS-C)																
MIN	398.50	399.50	392.40	49.86	41.53	38.36	49.94	29.66	29.79	0.99	1.30	1.70	1.90	4.90	5.80	7.30
MAX	400.70	401.90	394.60	53.22	47.07	43.21	50.07	32.76	32.88	1.00	1.50	2.00	2.10	5.40	6.80	8.80
AVG	399.59	400.26	393.10	51.62	43.93	40.15	50.01	31.03	31.16	1.00	1.43	1.86	1.98	5.14	6.32	8.10
B18-For-Block-A, B and Admin Block (SS-C)																
MIN	399.80	399.90	392.60	27.13	16.18	41.19	49.93	18.63	19.91	0.93	1.30	1.80	1.90	9.70	10.40	31.10



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
MAX	402.20	401.90	395.50	36.34	29.10	48.59	50.04	24.90	25.91	0.96	1.40	1.90	2.00	14.50	20.60	39.90
AVG	401.02	400.86	394.00	30.69	22.19	45.69	50.00	21.52	22.64	0.95	1.39	1.81	1.95	12.20	14.92	34.34
B19-For-Water Tank and Sewer pumping station (SS-C)																
MIN	400.80	400.60	393.80	20.87	29.72	20.37	49.93	13.91	16.39	0.85	1.30	1.80	1.90	3.40	5.80	4.30
MAX	402.10	402.00	395.70	21.04	29.96	20.64	50.05	14.06	16.54	0.85	1.40	1.90	2.00	3.50	6.20	4.40
AVG	401.45	401.28	394.67	20.97	29.87	20.54	50.01	14.00	16.47	0.85	1.40	1.84	1.98	3.46	5.96	4.39
B20-For-Applied Science (SS-C)																
MIN	398.80	392.30	398.90	14.51	26.12	9.29	49.95	6.33	12.18	0.52	1.80	1.90	1.30	12.60	9.90	23.50
MAX	400.90	394.40	401.50	17.90	28.73	14.65	50.02	7.52	14.01	0.54	1.90	2.00	1.40	18.10	11.30	39.30
AVG	399.90	393.32	400.01	16.58	27.24	13.04	49.98	6.88	13.05	0.53	1.81	1.93	1.38	15.28	10.64	27.51
B21-For-Block-C and Horticulture (SS-C)																
MIN	399.30	393.20	399.90	23.15	25.01	27.41	49.99	10.58	17.53	0.60	1.70	1.80	1.30	8.20	7.80	10.10
MAX	401.00	395.00	401.20	24.09	26.26	28.68	50.03	10.89	18.13	0.60	1.90	2.10	1.50	9.30	8.90	11.40



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
AVG	400.23	394.17	400.53	23.66	25.70	28.13	50.01	10.72	17.82	0.60	1.83	1.93	1.37	8.70	8.26	10.75
<b>B22-For-APJ Abdul Kalam Hostel (SS-C)</b>																
MIN	398.80	393.60	398.20	25.52	17.06	14.40	49.97	12.98	13.19	0.98	1.80	1.90	1.40	3.30	7.00	5.00
MAX	403.90	397.90	403.50	26.24	17.51	14.70	50.09	13.30	13.54	0.99	2.00	2.10	1.50	3.60	7.90	6.40
AVG	401.43	395.61	400.89	25.88	17.14	14.58	50.04	13.09	13.32	0.98	1.93	1.99	1.41	3.43	7.36	5.52
<b>Sub-Station D</b>																
<b>A9-For-Outgoing transformer 630 KVA (SS-D)</b>																
MIN	408.00	409.60	410.90	40.70	61.30	48.10	49.91	35.03	36.27	0.96	0.70	0.70	0.70	1.50	2.60	2.40
MAX	417.40	419.50	419.60	181.10	256.80	159.90	50.07	135.75	138.21	0.98	1.10	1.20	1.20	3.90	5.20	4.40
AVG	412.47	414.48	415.27	127.75	181.16	115.80	49.99	99.46	101.51	0.98	0.93	0.91	0.97	2.23	3.57	3.12
<b>A10-For-D G Set 250 KVA (SS-D)</b>																
MIN	402.80	411.90	409.00	49.50	54.30	47.40	50.27	35.63	36.05	0.98	2.20	2.00	1.40	3.10	4.20	3.40
MAX	412.30	414.00	414.30	187.10	114.80	115.70	50.37	90.46	91.78	0.99	3.00	2.50	2.20	10.20	9.80	9.10



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
AVG	406.45	413.04	410.86	144.14	94.81	99.88	50.31	79.18	80.18	0.99	2.30	2.19	1.56	4.20	5.43	4.55
B41-For-New Mass Communication Dept (SS-D)																
MIN	401.80	401.90	409.00	10.98	11.73	4.35	49.96	6.84	6.93	0.97	0.90	1.00	0.90	11.90	8.60	6.50
MAX	418.10	418.10	416.30	14.25	15.31	15.55	50.07	9.92	10.08	0.99	1.00	1.10	1.10	14.80	10.40	12.30
AVG	414.16	413.99	412.18	12.47	12.68	7.81	50.01	7.76	7.87	0.99	0.92	1.04	0.97	13.87	9.36	9.64
B42-For-New Hindi Dept (SS-D)																
MIN	405.70	409.50	404.80	2.28	1.07	2.15	49.91	1.27	1.30	0.91	0.80	1.00	0.90	3.50	3.80	5.60
MAX	410.50	413.80	408.90	12.22	1.08	2.64	50.02	3.69	3.75	0.99	1.00	1.20	1.00	15.60	4.40	6.70
AVG	407.51	411.05	406.51	7.94	1.07	2.30	49.96	2.61	2.66	0.98	0.98	1.08	0.98	9.59	4.11	6.29
B43-For- Zoology Dept. ground floor (SS-D)																
MIN	406.60	410.30	406.10	72.79	16.82	47.22	49.91	32.28	32.77	0.98	0.80	0.80	0.70	2.70	8.00	3.70
MAX	411.70	415.10	410.80	93.54	22.93	53.92	49.98	37.45	38.11	0.99	1.00	1.10	1.00	4.50	10.80	4.90
AVG	408.30	411.81	407.63	80.94	18.05	48.66	49.94	34.25	34.82	0.98	0.92	1.00	0.96	3.48	10.01	4.34



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



	Voltage-V1	Voltage-V2	Voltage-V3	Current-I1	Current-I2	Current-I3	Hz	Power KW	Power KVA	PF	%THD-V1	%THD-V2	%THD-V3	%THD-I1	%THD-I2	%THD-I3
<b>B44-For-Psychology dept. (SS-D)</b>																
MIN	412.00	414.80	411.00	34.96	41.64	31.07	49.98	26.06	26.20	0.99	0.70	0.70	0.60	7.70	5.50	2.20
MAX	413.30	416.40	412.30	41.80	44.14	37.79	50.08	29.14	29.30	1.00	0.90	0.80	0.80	10.10	7.10	5.00
AVG	412.65	415.74	411.54	36.00	43.61	34.93	50.04	27.21	27.35	0.99	0.75	0.78	0.73	9.41	6.32	3.65
<b>B45-For-VSMP Hostel (SS-D)</b>																
MIN	414.10	415.40	412.60	25.12	11.04	16.55	49.94	12.52	12.67	0.99	0.70	0.70	0.70	3.70	4.30	3.00
MAX	415.30	416.60	413.70	25.40	11.26	18.02	50.04	12.88	13.04	0.99	0.90	0.90	0.80	4.40	4.80	4.20
AVG	414.73	416.07	413.31	25.28	11.12	16.98	49.99	12.63	12.77	0.99	0.80	0.81	0.78	4.03	4.62	3.53
<b>B46-For-Pt. Deendayal Upadhyay Hostel (SS-D)</b>																
MIN	407.20	409.30	405.60	13.03	17.39	12.38	49.94	9.80	10.22	0.96	0.70	0.80	0.70	6.60	1.60	4.60
MAX	413.70	415.40	412.40	15.57	17.85	13.09	50.07	10.41	10.84	0.96	1.30	1.20	1.20	8.50	2.50	5.20
AVG	410.77	412.46	409.34	13.72	17.74	12.63	50.01	10.03	10.47	0.96	0.96	1.00	0.96	7.25	1.97	4.93



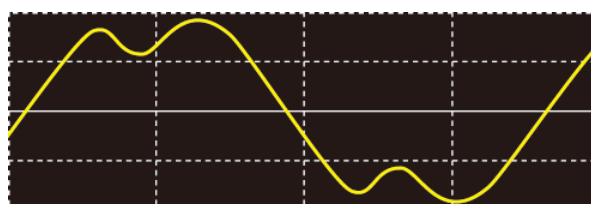
## 10. STUDY OF POWER QUALITY

Recently, electricity consumers have shown increasing concern for power quality. Indeed, power quality standards have become higher than before due to sensitivity of electronic gadgets and automation devices. Power Quality is the key to successful delivery of quality service of an IT industry. It is now even more critical to the industry because of increasing application of electronic loads and electronic controllers which are sensitive to the quality of power supplied.

In this study, the consumers are provided with the basic knowledge of power quality, while on the other hand, the existent regulations are evaluated in terms of consumers' rights so that poor power quality costs and loss are identified and amended. There are so many regulations in relation to the rights of electrical power consumers in legislation that regulates the relations between distribution companies and the consumers, whereas, in this study, only the issue of power quality is dealt with.

Power quality indices viz total voltage & current harmonics distortion (THD), Power Factor (pf), Transformer De-rating Factor "K", dielectric stress Crest Factor (CF), unbalancing in voltage & in current and Flicker Factor etc. If their values remain within the limits and that allows utilities to function in their intended manner without any interruption. Similarly, Power quality also helped to ensure that Unit remain operational at all times.

Harmonics are generated by semi-conductor control devices in the power supply of equipment as a result of distorted voltage and current waveforms. When the harmonic component is big, it may cause serious accidents such as overheating or noise in motors or transformers, burn out reactors in phase compensation capacitors, etc.,



Harmonic Current causes overheating of conductors and their insulation, overheating of transformers with increased losses, overloaded Neutral conductors, Neutral to Earth potential, overheating of capacitors and ultimately premature ageing or failure of equipment.

Harmonic Voltage – causes linear loads to draw non-linear current resulting in current distortion effects, torque pulsation in motors, capacitor dielectric failure, insulation breakdown, server and network equipment power supply failure, electronic lighting failure, malfunction of sensitive electronic equipment and, again, excessive distortion in distribution supply networks.

The Institute of Electrical & Electronic Engineers (IEEE), various government agencies and other organizations have been studying these problems and effects for several years. As a result, they have issued design guidelines and recommended practices



The Institute of Electrical and Electronics Engineers (IEEE) & International Electro technical Commission (IEC) has published different standards time to time in this regard to improve the quality of power. IEEE 1159 describes recommended practices for monitoring of power quality. Comparison of different standards given below in table,

PARAMETER	IEEE 519	IEC 61000-2-2 (FOR EQUIPMENT)	EN 50160 (ONLY UP TO 35 KV)
<b>Harmonics</b>	a) THD voltage 1.5 -5.0% THD current 5 -20% at PCC	THD<8%	Individual harmonics limit 0.5-6.0%
<b>Voltage Unbalance</b>	NA	2%	2-3%

Power Quality Term

**Voltage Variation Compliance**

Voltage is relatively small deviations of voltage characteristics around their nominal or ideal values. The two basic examples are voltage magnitude and frequency

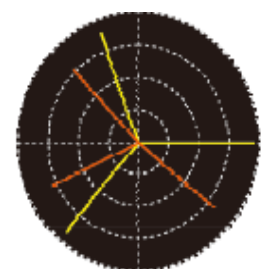
As per the Electricity (supply) Act 1948 & 1956, Electricity Act 2003, Electricity Code 2005, Voltages must be maintained within prescribed limits for various level of supply Voltage as depicted below,

- In case of LT supply, voltage variation should be within the limit of +/- 6%
- ii. In case of HT supply, voltage variation should be within the limit of +/- 6% + 6% & - 9%
- iii. In case of EHT supply, voltage variation should be within the limit of +/- 6%+ 10% & - 12.5%



However, if the voltage at the point of commencement of supply varies beyond the above-specified limits, the Licensee (Power supply Company) shall ensure to get it rectified within following time limits, after receiving a complaint.

**Voltage Unbalance Compliance**

Power is distributed to customers by way of 3 phase electricity, in which each phase is initially transmitted at 120o before and after the proceeding and preceding phase and this is known as a balanced supply. However, differing loads on each of the phases causes imbalances between phases and amplitudes and can cause problems that may risk damage to





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		28-05-2022	

connected equipment and in extreme cases could pose electric shock risks.

Where such unbalances are identified, appropriate work is done either within the customer's installation or by balancing of the customer connections on the LV or the High Voltage (HV) distribution networks.

The Technical Rules outline the limit for the negative phase sequence component of the voltage (in percent of the positive sequence component) to be less than 2%.

But as per UPERC Electricity Code 2005, this limit is slightly higher and Power Supply (Licensee) shall ensure that the voltage unbalance does not exceed 3% at the point of commencement of supply.

### **PF, DPF & Tan**

Power factor is the ratio between the KW and the KVA drawn by an electrical load where the KW is the actual load power and the KVA is the apparent load power. It is a measure of how effectively the current is being converted into useful work output and more particularly is a good indicator of the effect of the load current on the efficiency of the supply system.

There are two types of power factor, displacement power factor and distortion power factor caused by harmonics distortion. Only displacement power factor can be corrected by the addition of capacitors. Tangent is the phase angle in arc tan

The power factor of the distribution system and bulk consumer shall not be less than 0.95.

### **Harmonics Compliance**

Harmonics are certain characteristics of voltage and current on a power system that arise from particular types of equipment that are connected to the system. Harmonics can result in extra strain on the network and devices connected to the network.

Various National and International organization has set up limit for Voltage and Current harmonics.

- As per central Electricity Authority: Paper 2007(technical paper)
  - (1) The total harmonic distortion for voltage at the connection point shall not exceed 5% with no individual harmonic higher than 3%.
  - (2) The total harmonic distortion for current drawn from the transmission system at the connection point shall not exceed 8%.
- As per the ELECTRICITY SUPPLY CODE, 2005 issued by UP Electricity Regulatory Commission, the total harmonic voltage distortion shall not exceed the limits mentioned below:



EHT = 4% HT = 5% LT = 20%

### Crest factor (Ucf, Acf, Vcf)

The crest factor or peak-to-average ratio (PAR) or peak-to-average power ratio (PAPR) is a measurement of a waveform, calculated from the peak amplitude of the waveform divided by the RMS value of the waveform.

$$C = \frac{|x|_{\text{peak}}}{x_{\text{rms}}}$$

The minimum crest Factor is 1.0

### Flicker (PST)

The power supply network voltage varies over time due to perturbations that occur in the processes of electricity generation, transmission and distribution. Interaction of electrical loads with the network causes further deterioration of the electrical power quality.

High power loads that draw fluctuating current, such as large motor drives and arc furnaces, cause low frequency cyclic voltage variations that result in:

Flickering of light sources can cause significant physiological discomfort, physical and psychological tiredness, and even pathological effects for human beings, Problems with the stability of electrical devices and electronic circuits.

Recurrent small changes of network voltage amplitude cause flickering of light sources. The effect is popularly referred to as 'flicker' and is a significant power quality parameter.

The value flicker severity index VPST=< 1.0 (for 10 minutes)

### K-Factor

K-factor is a weighting of the harmonic load currents according to their effects on transformer heating, as derived from ANSI/IEEE C57.110. A K-factor of 1.0 indicates a linear load (no harmonics). The higher the K-factor will be the greater the harmonic heating effects (IEEE Standard 1100-1992).

### 4.2. Instrumentation Support

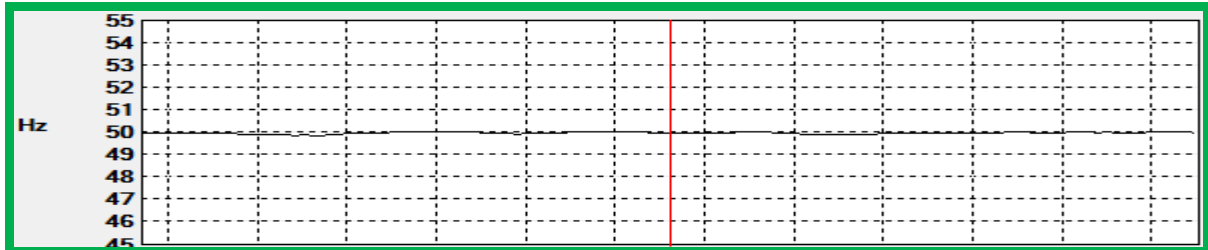
Three Phase Power Manager with CTs and PTs. Power Quality has been measured at various locations through portable power manager; the recorded data are as follows: -



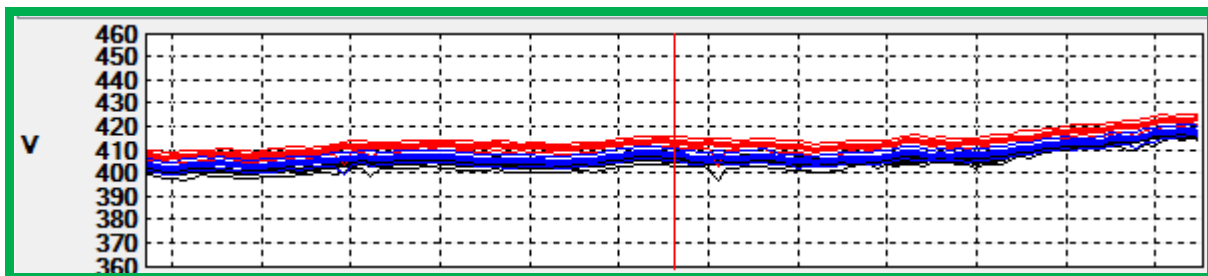
- METER NO. XE498276 (SUB-STATION -A):**

**A1-For- Transformer 1000KVA, OUTPUT (SS-A)**

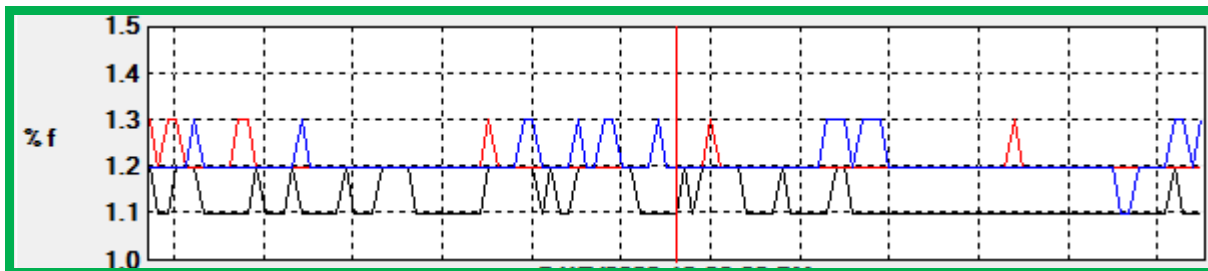
**Frequency**



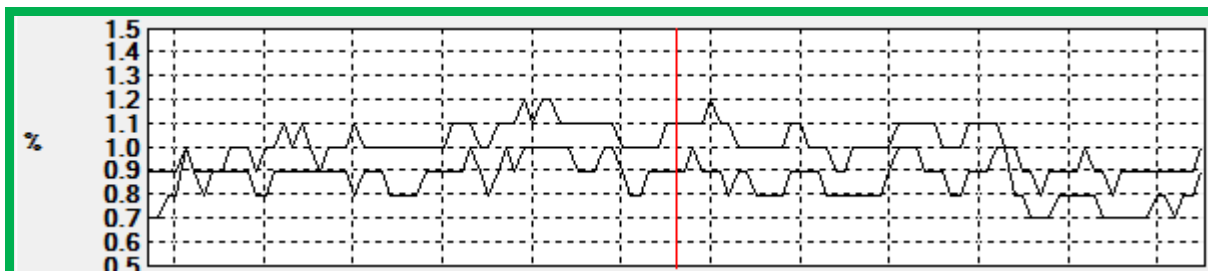
**Voltage**



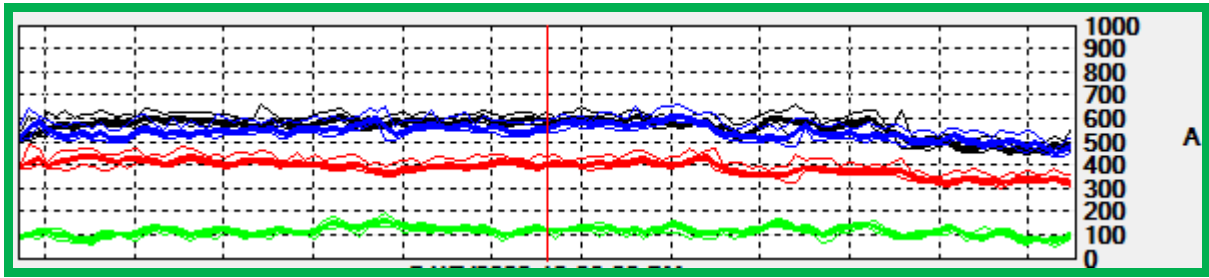
**Voltage Harmonics**



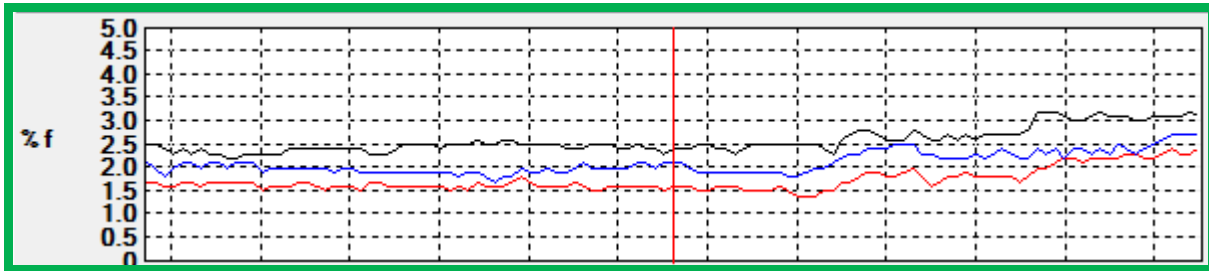
**Voltage Un-balance**



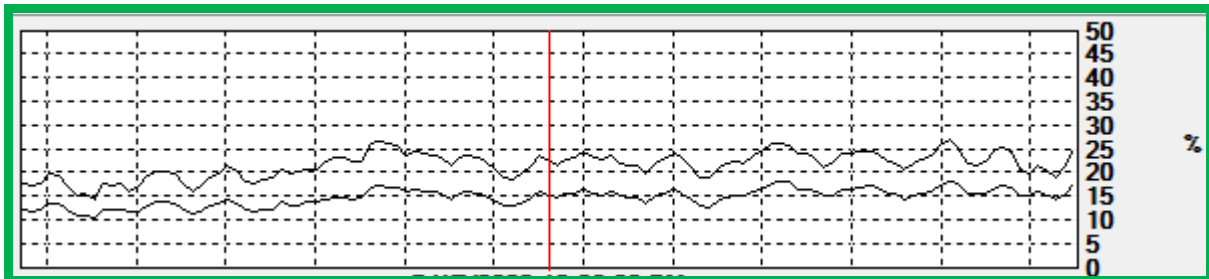
**Current**



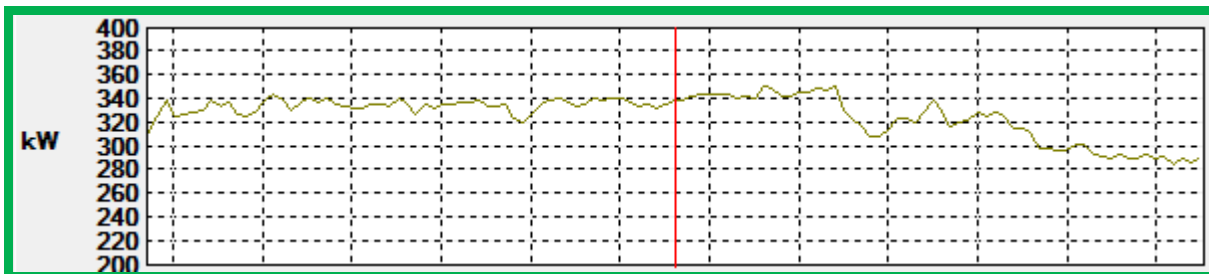
Current Harmonics



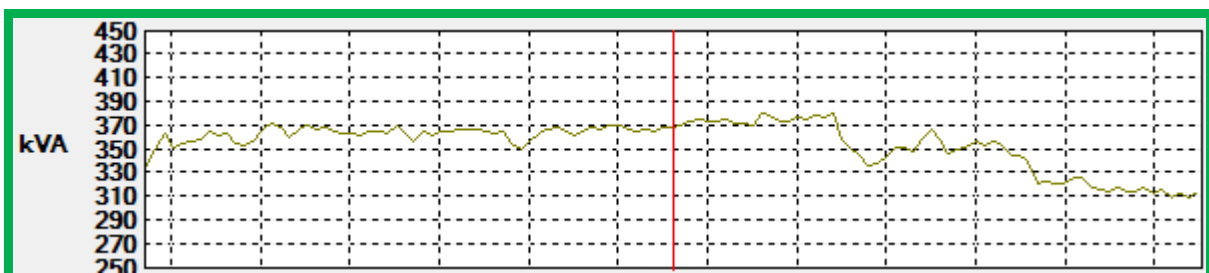
Current Un-balance



Power in KW

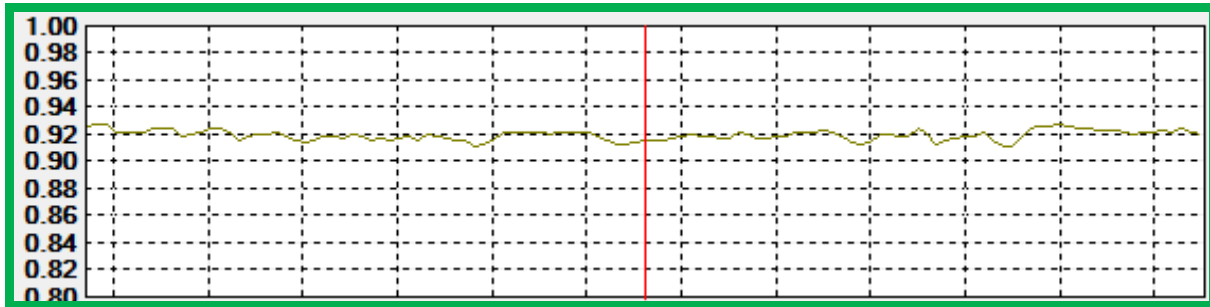


Power in KVA





**Power Factor**



**Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance**

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	400.30	406.90	402.10	464.80	324.30	451.00	0.90	0.87	0.94	49.85	0.80	14.40
MAX	416.50	423.40	418.80	609.00	441.00	611.20	0.92	0.91	0.96	50.06	1.20	27.10
AVG	405.63	412.88	407.83	567.10	393.33	545.40	0.91	0.89	0.95	49.98	1.01	21.67

**Min, Average & Max Rang of Flickering, "K" Factor & Harmonics**

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.20	0.18	0.21	1.00	1.00	1.00	1.10	1.10	1.10	2.20	1.40	1.70
MAX	1.42	1.66	2.00	1.00	1.00	1.00	1.20	1.30	1.20	3.20	2.40	2.70
AVG	0.44	0.51	0.44	1.00	1.00	1.00	1.19	1.22	1.12	2.58	1.73	2.10

**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.46	1.44	1.44



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ENERGY AUDIT

Rev 0

28-05-2022

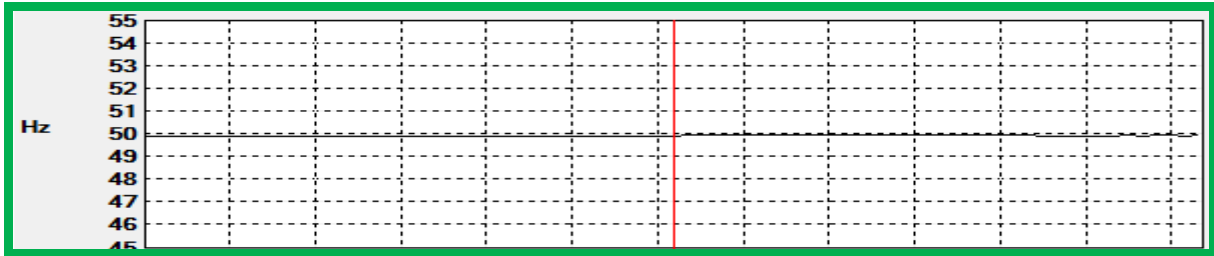


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.43	1.43	1.48	1.47	1.47
AVG	1.43	1.43	1.43	1.46	1.45	1.45

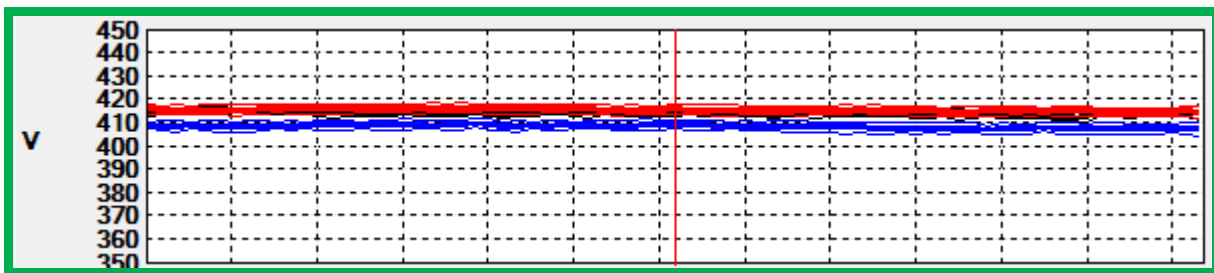


**A2-For- Admin BLOCK (SS-A)**

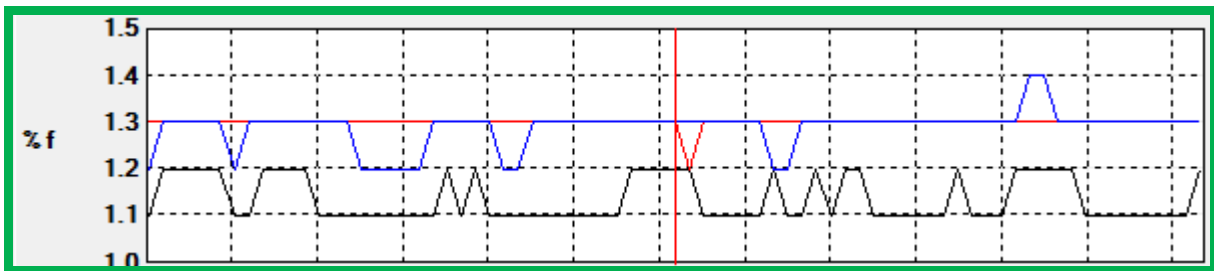
**Frequency**



**Voltage**



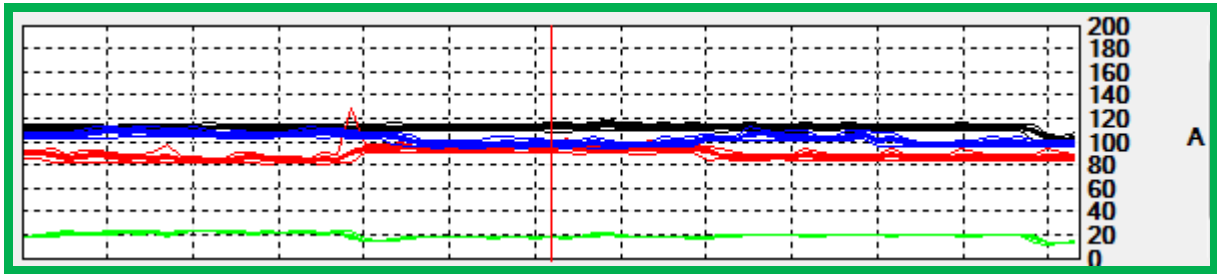
**Voltage Harmonics**



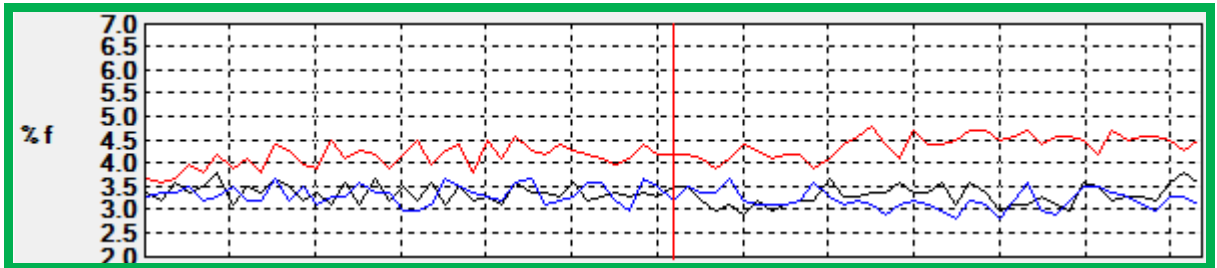
**Voltage Un-balance**



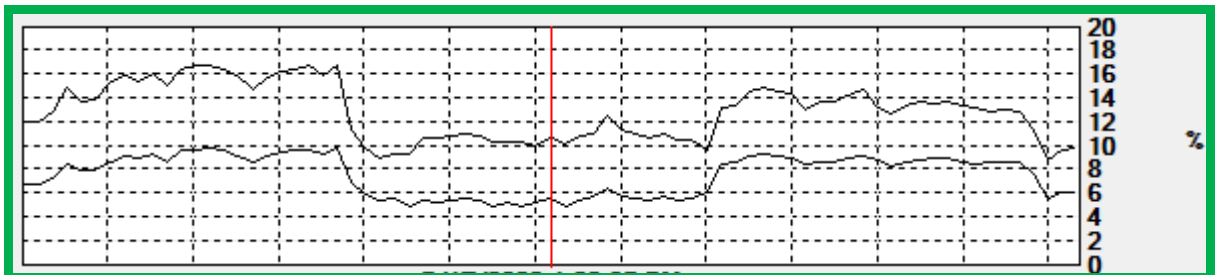
**Current**



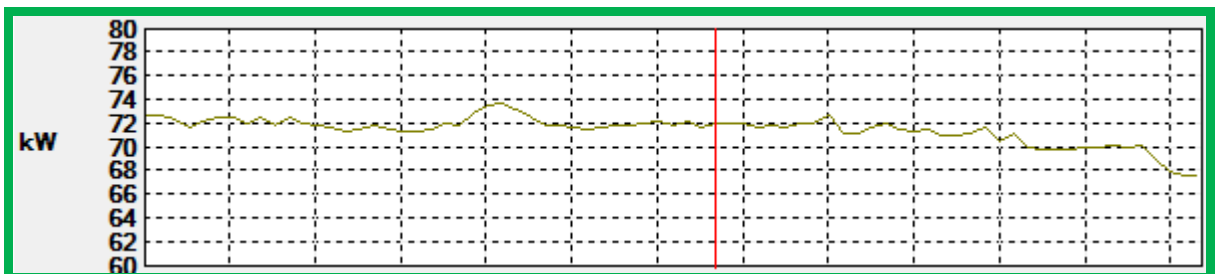
Current Harmonics



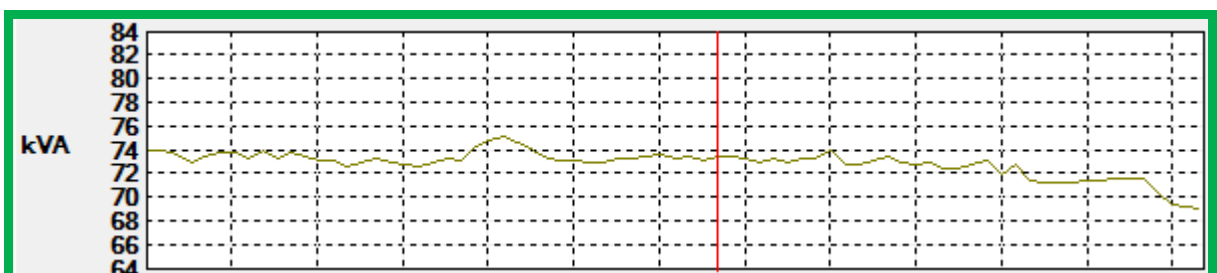
Current Un-balance



Power in KW



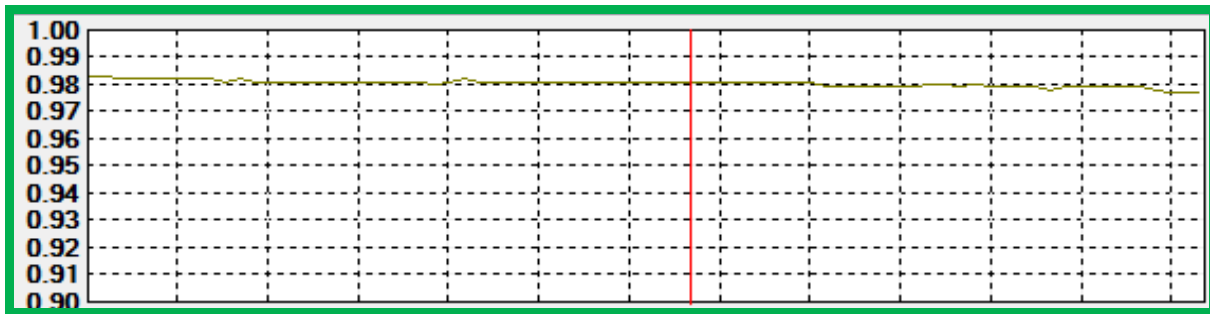
Power in KVA







**Power Factor**



**Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance**

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	412.40	414.60	407.40	103.80	84.80	98.60	0.97	0.97	0.98	49.89	0.90	8.80
MAX	415.60	416.60	409.40	115.60	96.00	110.00	0.98	0.99	0.99	49.96	1.20	16.80
AVG	414.45	415.65	408.55	112.71	89.79	103.35	0.98	0.98	0.99	49.92	1.05	12.88

**Min, Average & Max Rang of Flickering, "K" Factor & Harmonics**

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.00	1.00	1.20	1.30	1.10	2.90	3.60	2.80
MAX	---	---	---	1.00	1.00	1.00	1.30	1.40	1.20	3.80	4.80	3.70
AVG	---	---	---	1.00	1.00	1.00	1.20	1.31	1.15	3.35	4.27	3.28

**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.46	1.48	1.46



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

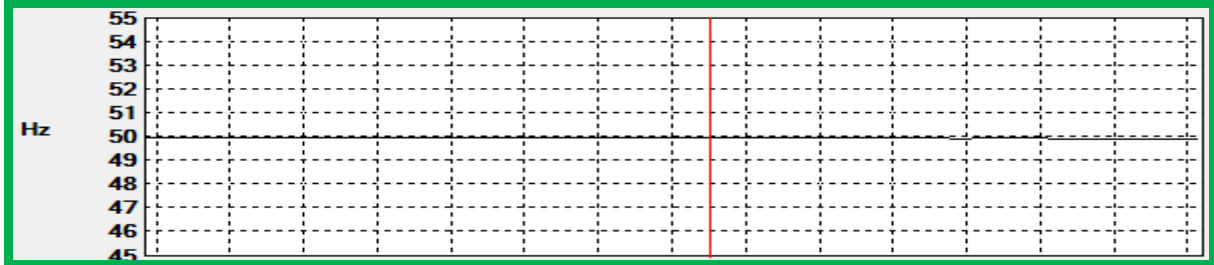


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.43	1.43	1.49	1.58	1.51
AVG	1.43	1.43	1.43	1.47	1.50	1.48

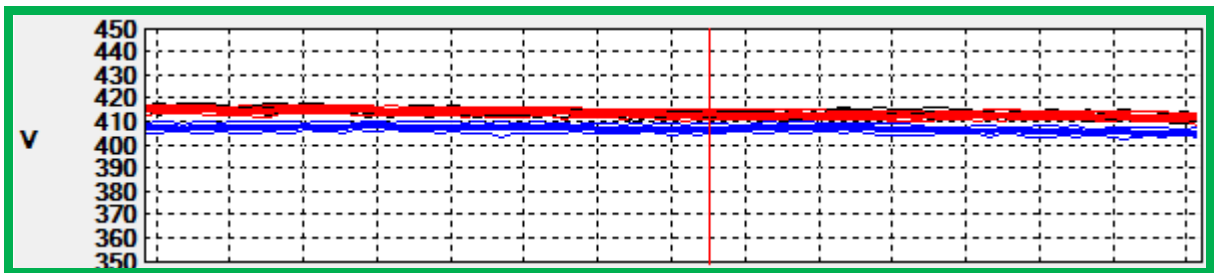


**A3-For-Rani Laxmi Bai Hostel, Guest House, Dhan Singh Gujjar Hall and Railway  
COUNTER (SS-A)**

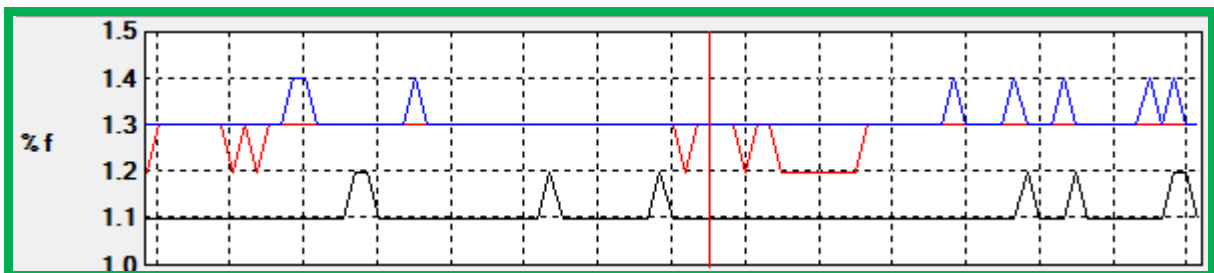
**Frequency**



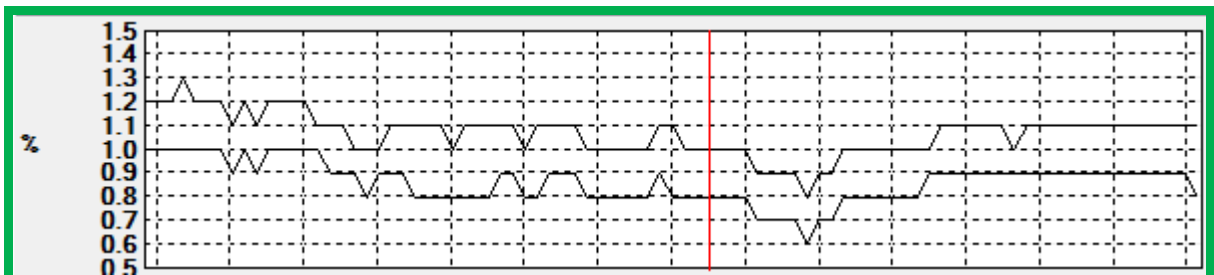
**Voltage**



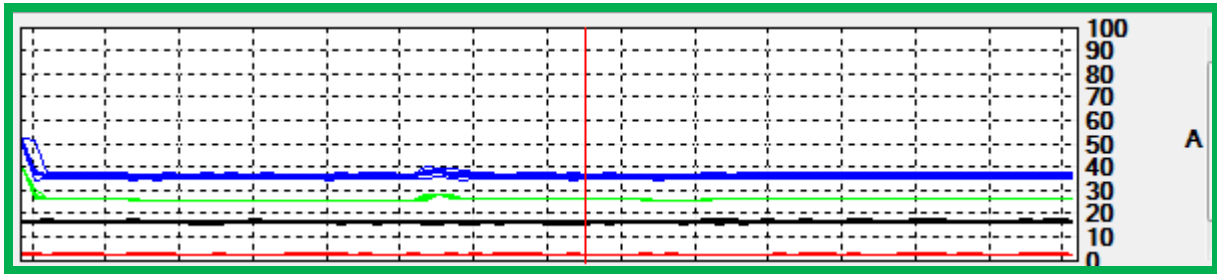
**Voltage Harmonics**



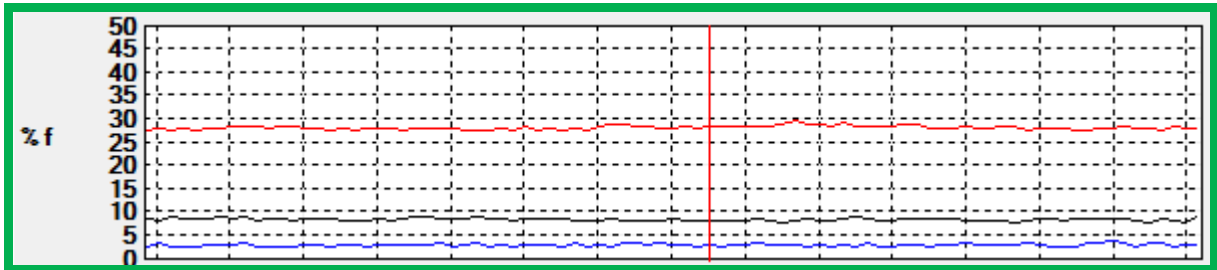
**Voltage Un-balance**



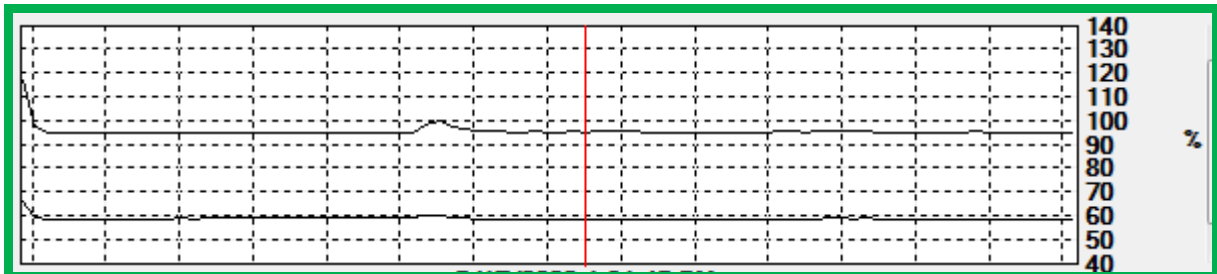
**Current**



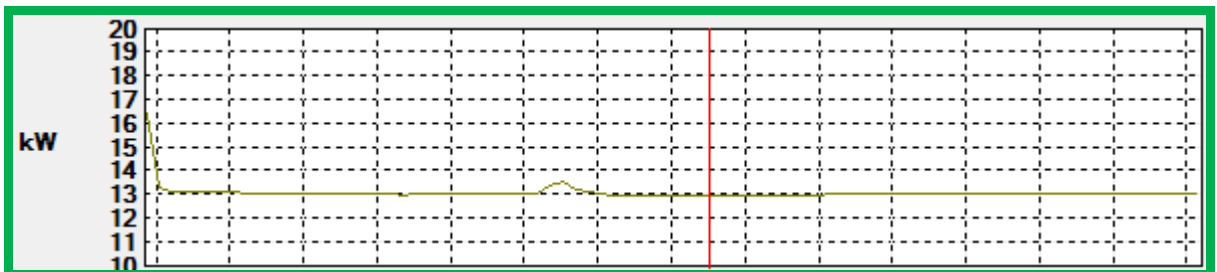
Current Harmonics



Current Un-balance



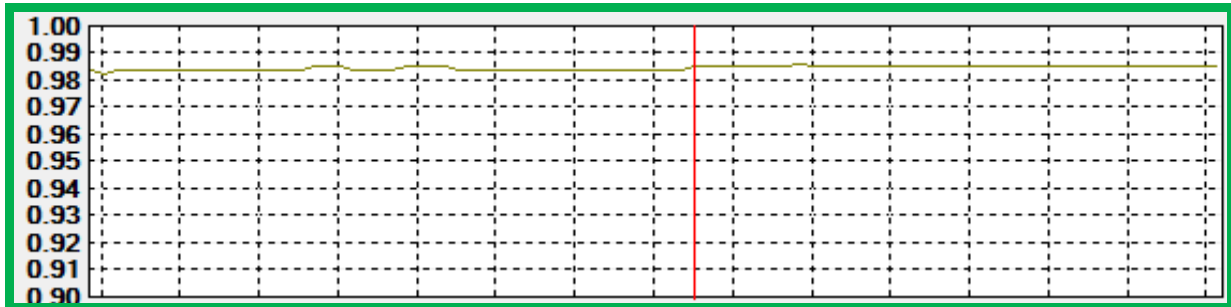
Power in KW



Power in KVA



**Power Factor**



**Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance**

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	411.70	411.90	405.20	16.71	2.62	36.16	0.96	0.94	0.99	49.90	0.90	94.80
MAX	416.00	415.40	408.30	16.91	2.80	50.85	0.97	0.95	1.00	49.98	1.30	116.70
AVG	414.06	413.75	407.14	16.81	2.67	36.62	0.96	0.95	1.00	49.95	1.10	95.78

**Min, Average & Max Rang of Flickering, "K" Factor & Harmonics**

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.05	1.00	1.20	1.30	1.10	7.70	27.60	2.40
MAX	---	---	---	1.00	1.06	1.00	1.20	1.50	1.30	9.10	29.60	3.70
AVG	---	---	---	1.00	1.06	1.00	1.20	1.34	1.20	8.46	28.19	2.99

**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.55	2.24	1.48



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

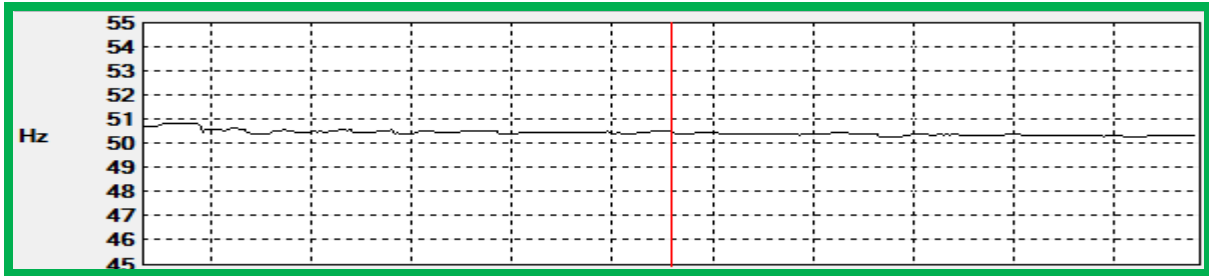


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.43	1.44	1.59	2.39	1.56
AVG	1.43	1.43	1.44	1.57	2.31	1.48

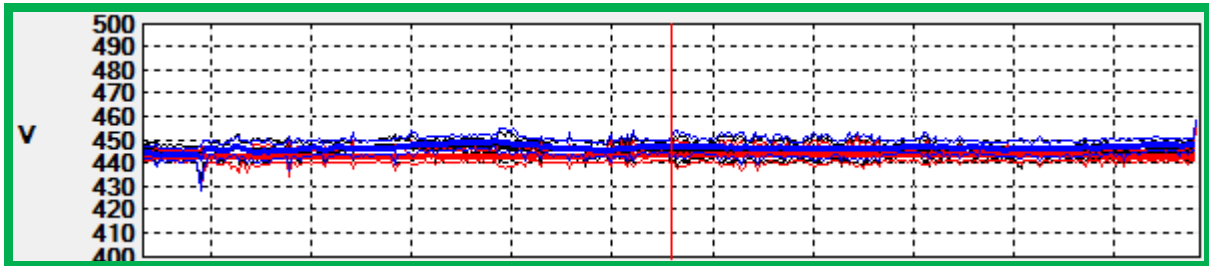


**A12-For-D. G Set 320 KVA (SS-A)**

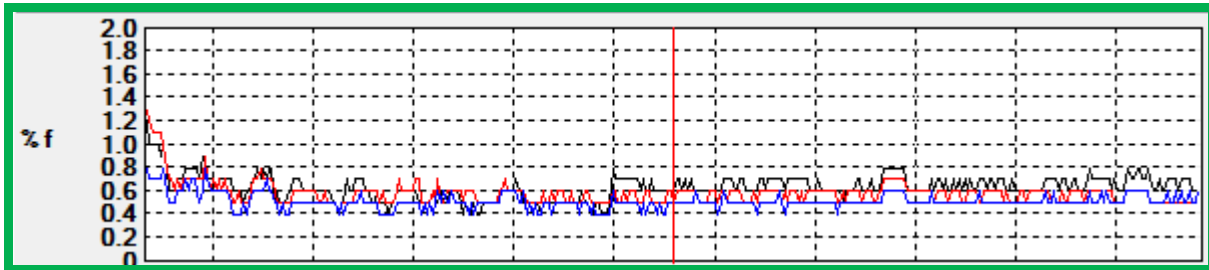
**Frequency**



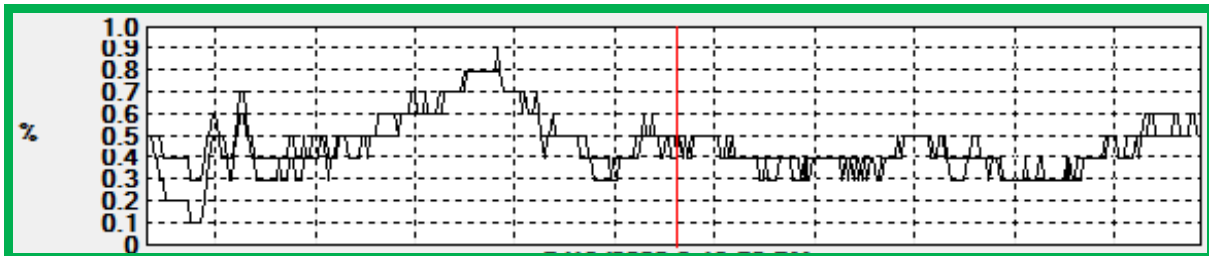
**Voltage**



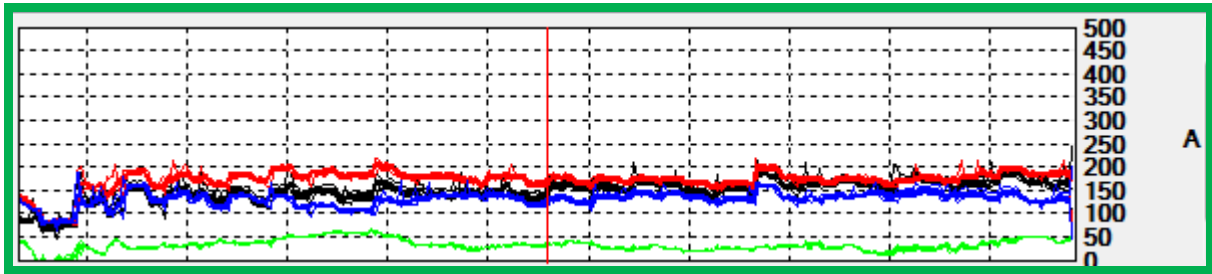
**Voltage Harmonics**



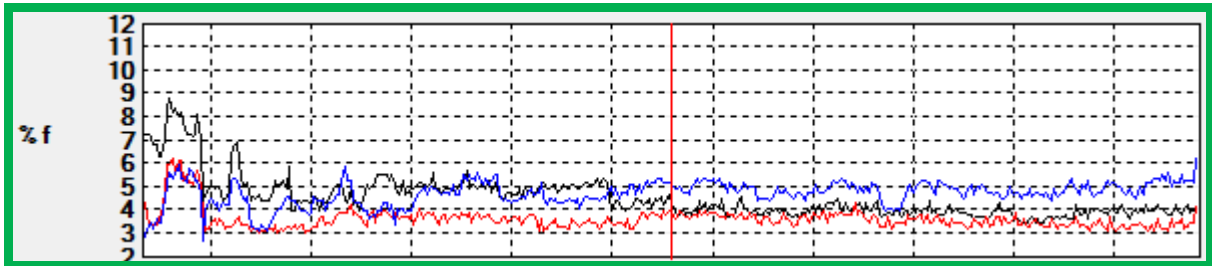
**Voltage Un-balance**



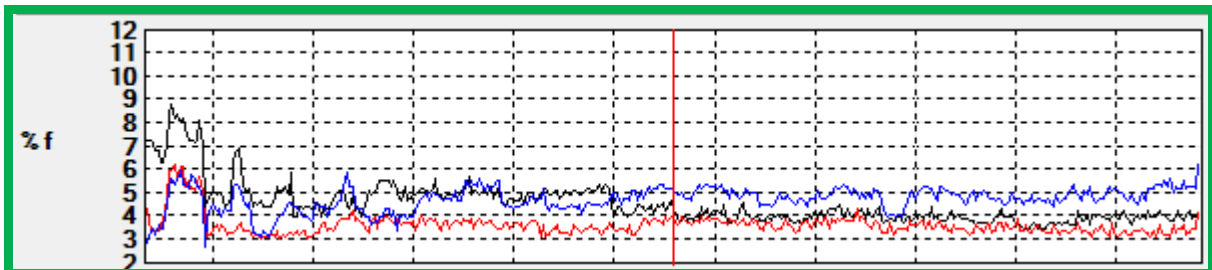
**Current**



Current Harmonics



Current Un-balance



Power in KW

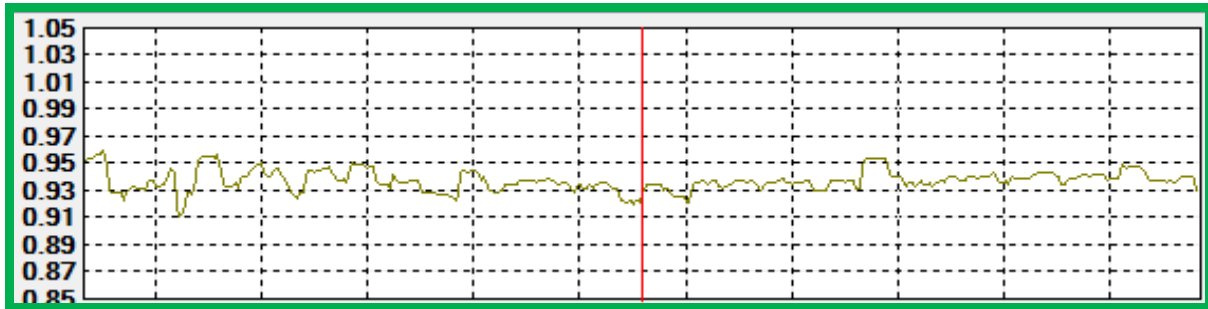


Power in KVA





**Power Factor**



**Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance**

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	443.60	442.70	442.60	67.30	83.60	82.40	0.93	0.93	0.83	50.26	0.10	5.00
MAX	448.20	444.60	450.10	190.90	207.60	175.40	0.97	0.98	0.94	50.84	0.80	32.00
AVG	445.73	443.51	446.85	150.59	173.89	133.02	0.95	0.95	0.90	50.44	0.44	15.83

**Min, Average & Max Rang of Flickering, "K" Factor & Harmonics**

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.23	1.23	1.42	1.00	1.00	1.00	0.50	0.40	0.40	3.50	3.00	2.70
MAX	1.58	1.50	1.58	1.00	1.00	1.00	1.30	1.00	0.90	8.80	6.20	6.30
AVG	1.35	1.32	1.53	1.00	1.00	1.00	0.63	0.53	0.57	4.53	3.63	4.73

**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.41	1.41	1.41	1.55	1.47	1.48



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

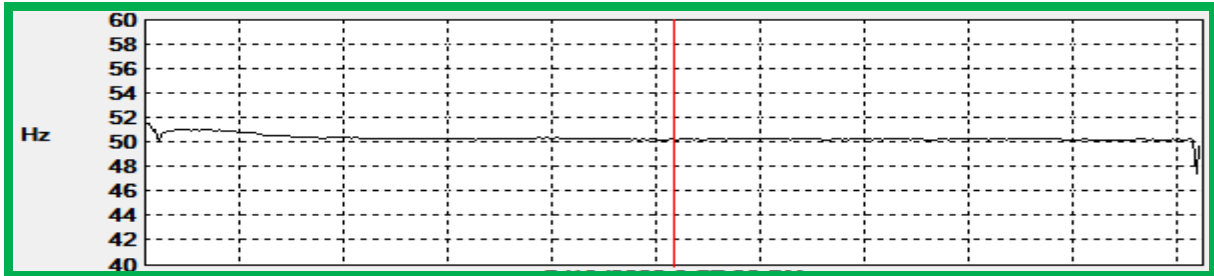


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.43	1.43	1.90	1.71	1.87
AVG	1.42	1.42	1.42	1.59	1.52	1.53

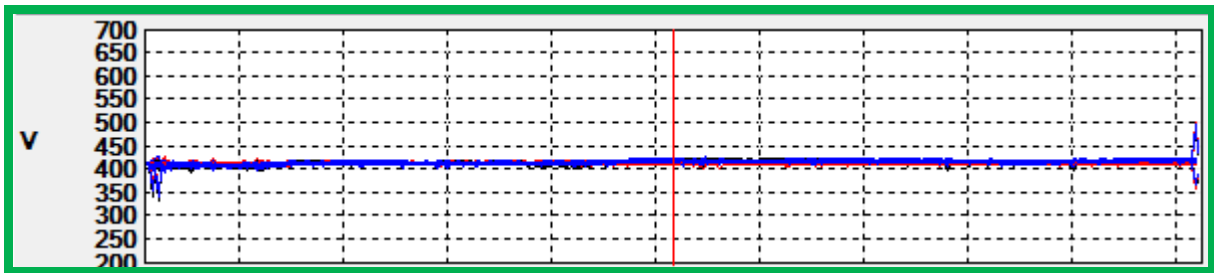


**A13-For-D. G Set 250 KVA (SS-A)**

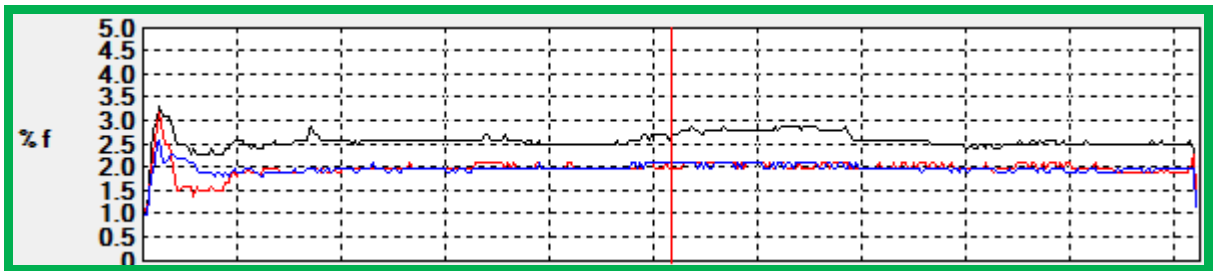
**Frequency**



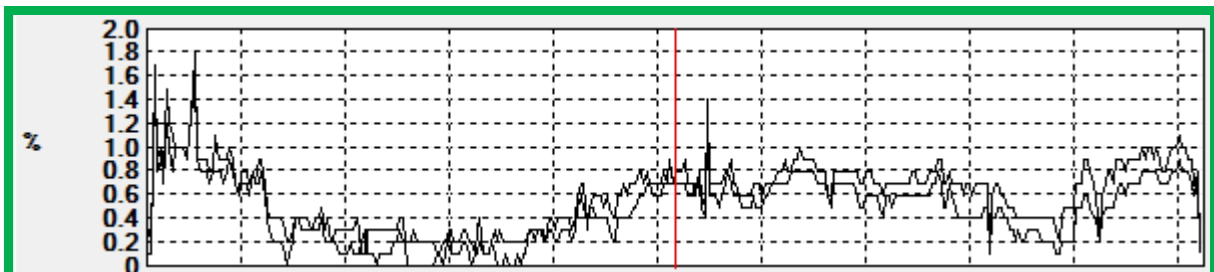
**Voltage**



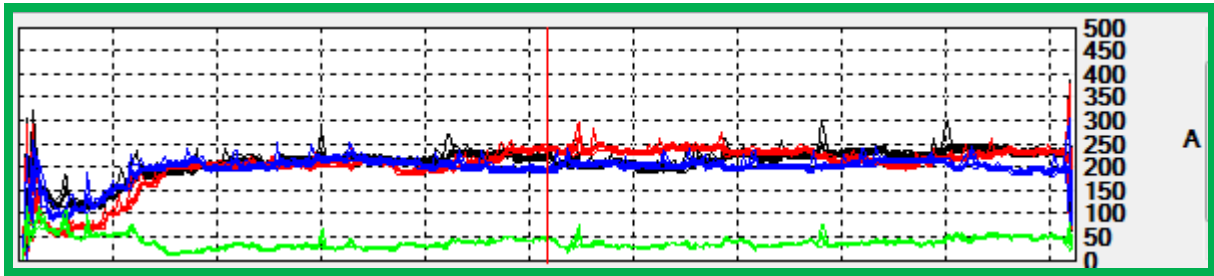
**Voltage Harmonics**



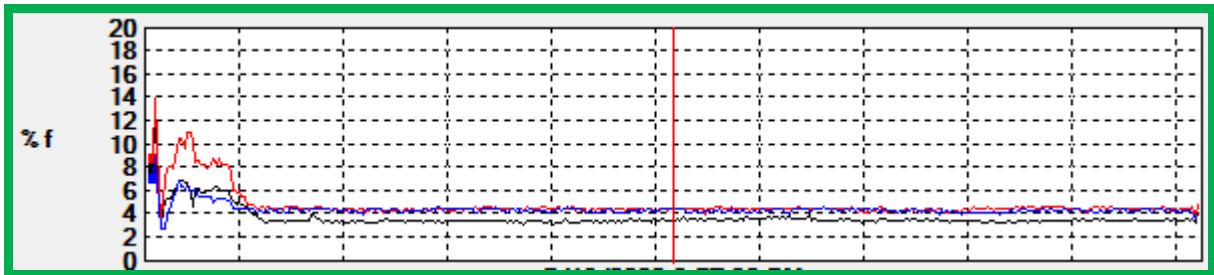
**Voltage Un-balance**



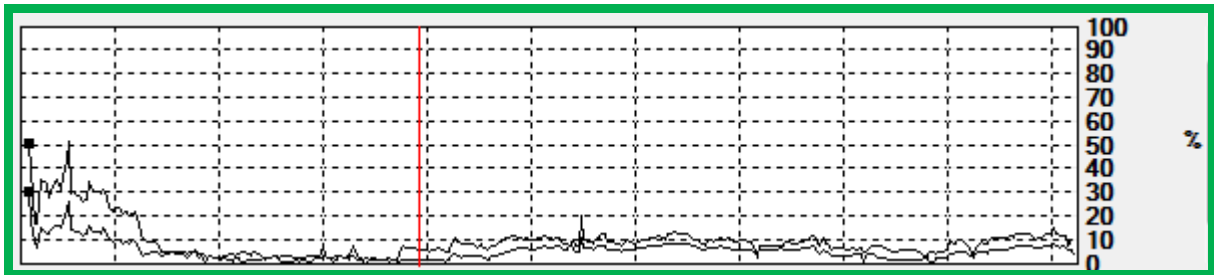
**Current**



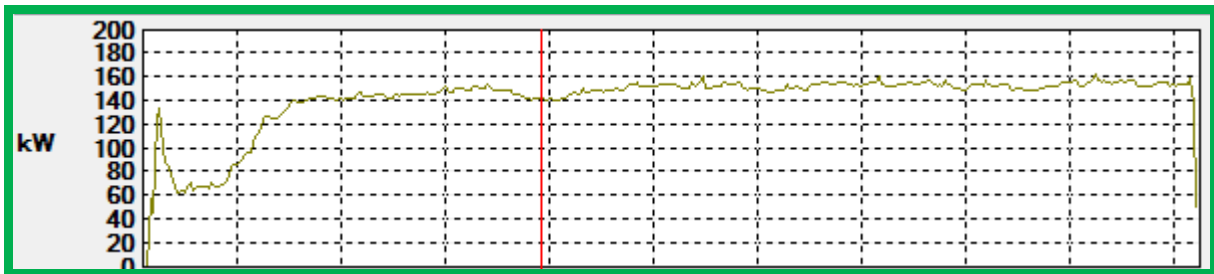
Current Harmonics



Current Un-balance



Power in KW



Power in KVA



**Power Factor**



**Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance**

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	400.50	410.00	404.10	75.20	46.80	64.10	0.82	0.83	0.83	47.42	0.00	0.20
MAX	422.40	417.00	422.70	251.70	276.20	234.70	0.98	0.98	0.96	51.11	1.70	51.80
AVG	414.94	414.51	415.89	210.62	205.09	196.98	0.97	0.97	0.95	50.35	0.49	9.83

**Min, Average & Max Rang of Flickering, "K" Factor & Harmonics**

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.54	0.50	1.00	1.00	1.00	1.00	1.40	1.30	1.10	3.10	3.70	2.70
MAX	1.54	1.18	1.50	1.01	1.04	1.01	3.40	2.70	3.50	12.10	13.90	9.00
AVG	1.54	1.05	1.09	1.00	1.00	1.00	2.37	1.76	2.45	3.70	4.78	4.40

**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.42	1.42	1.49	1.51	1.50



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

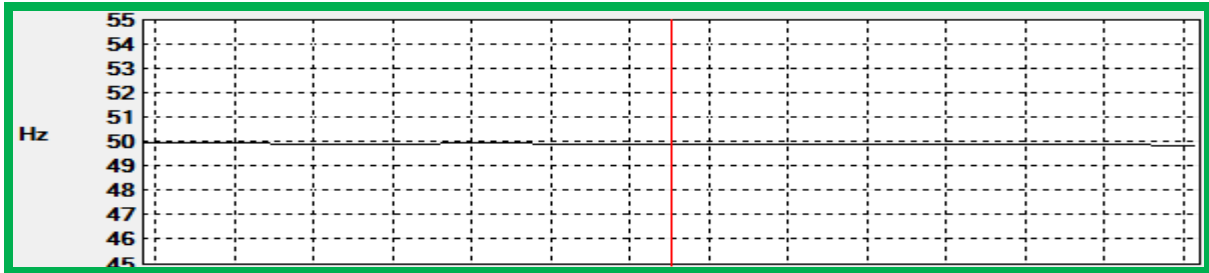


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.51	1.53	1.52	1.99	3.56	2.09
AVG	1.43	1.43	1.43	1.53	1.54	1.55

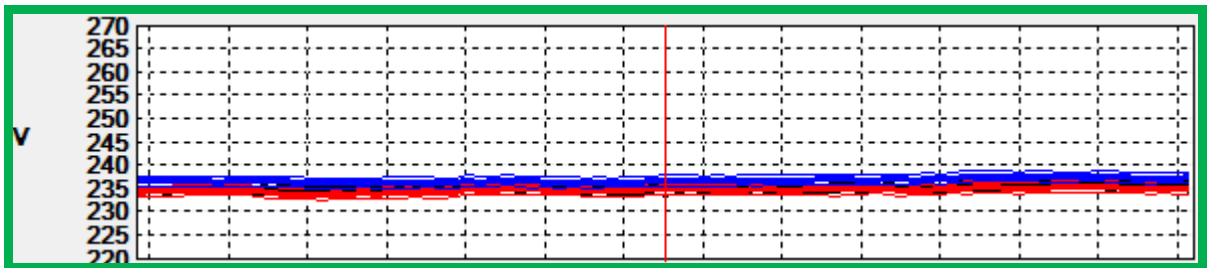


**B1-For-Durga Bhabhi Hostel UG (SS-A)**

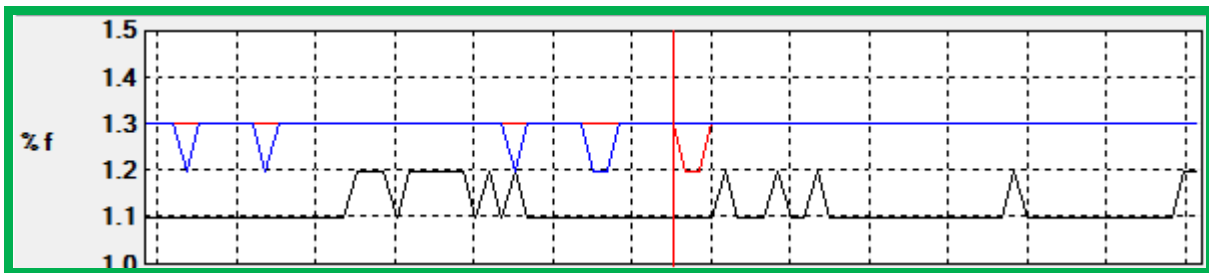
Frequency



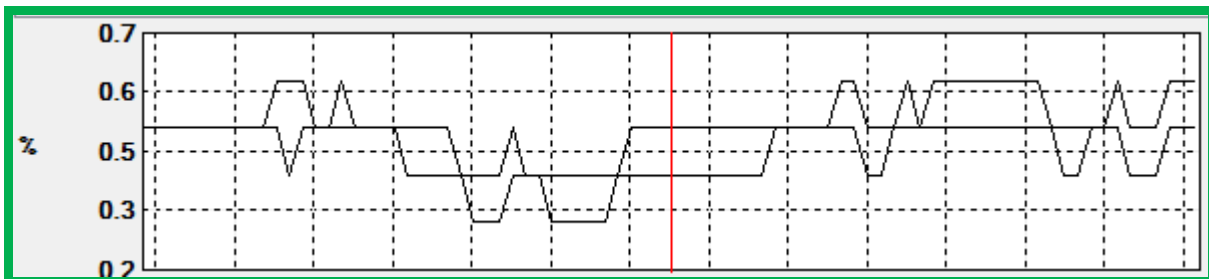
Voltage



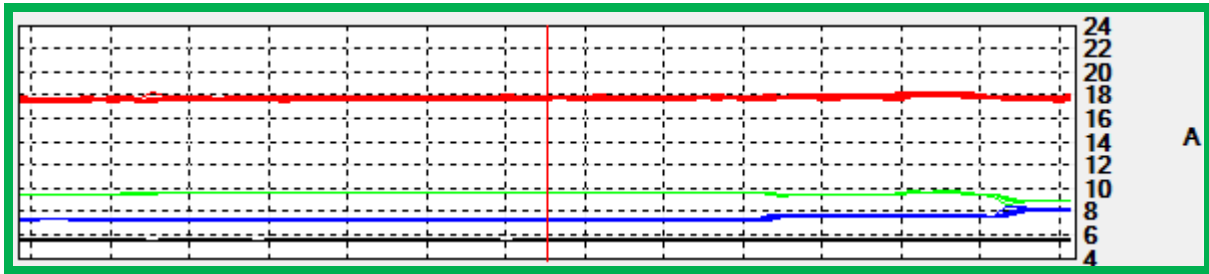
Voltage Harmonics



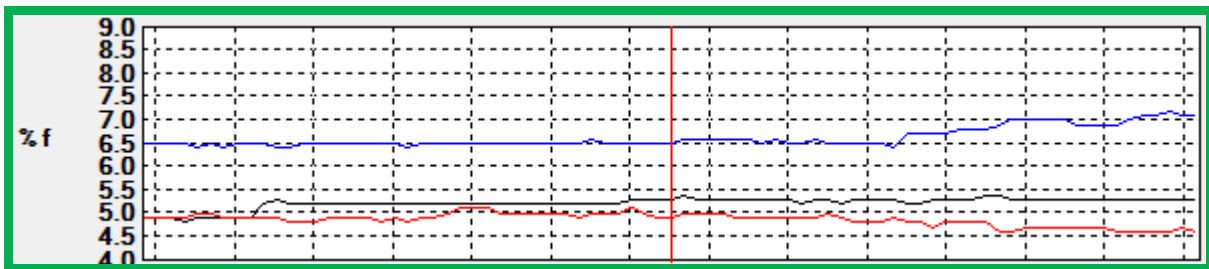
Voltage Un-balance



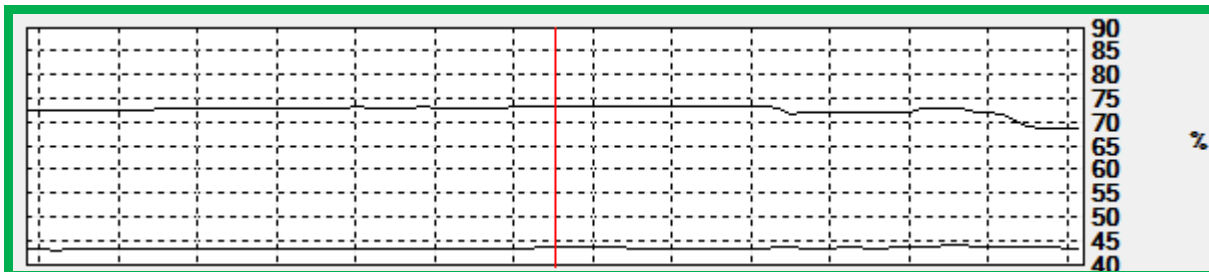
Current



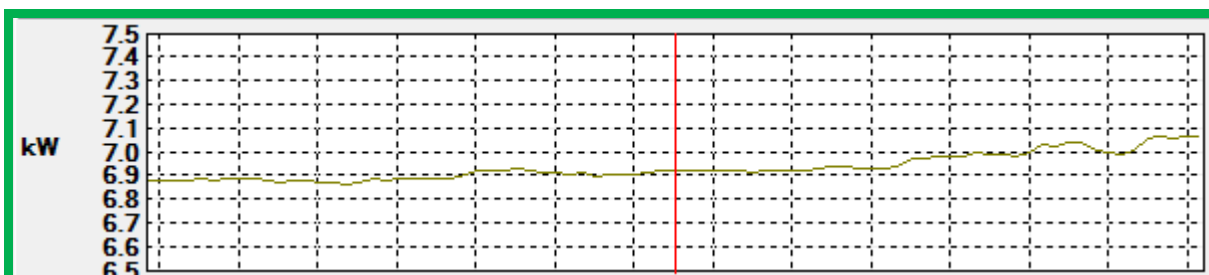
Current Harmonics



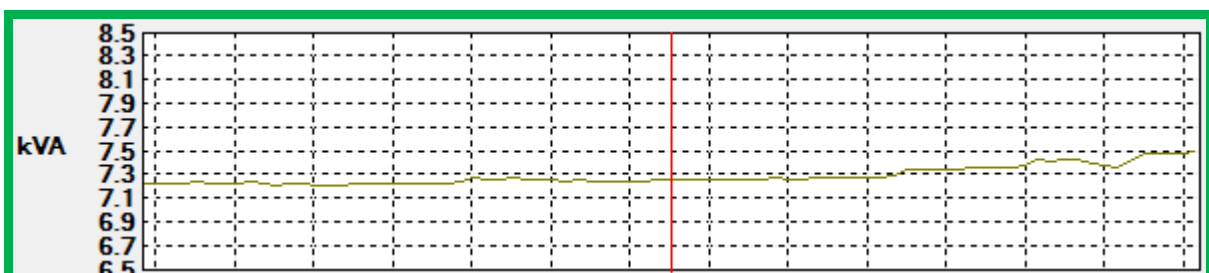
Current Un-balance



Power in KW



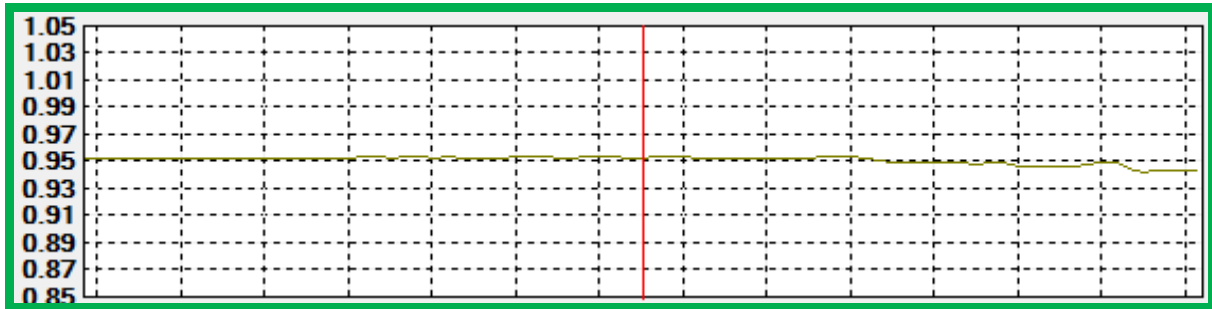
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	405.50	407.30	408.70	5.60	17.67	7.38	0.99	0.96	0.87	49.86	0.30	68.90
MAX	407.80	410.30	411.00	5.67	18.15	8.22	0.99	0.96	0.90	49.95	0.60	73.60
AVG	406.43	408.78	409.53	5.63	17.82	7.51	0.99	0.96	0.90	49.92	0.44	72.68

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.00	1.00	1.20	1.20	1.10	4.80	4.60	6.40
MAX	---	---	---	1.00	1.00	1.00	1.30	1.40	1.20	5.40	5.10	7.20
AVG	---	---	---	1.00	1.00	1.00	1.20	1.29	1.18	5.22	4.86	6.62

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.35	1.45	1.35



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

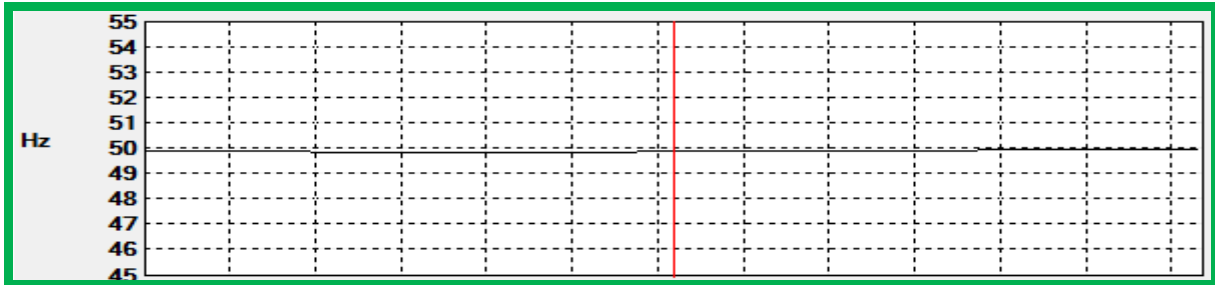


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.44	1.43	1.36	1.48	1.39
AVG	1.43	1.43	1.43	1.36	1.47	1.36

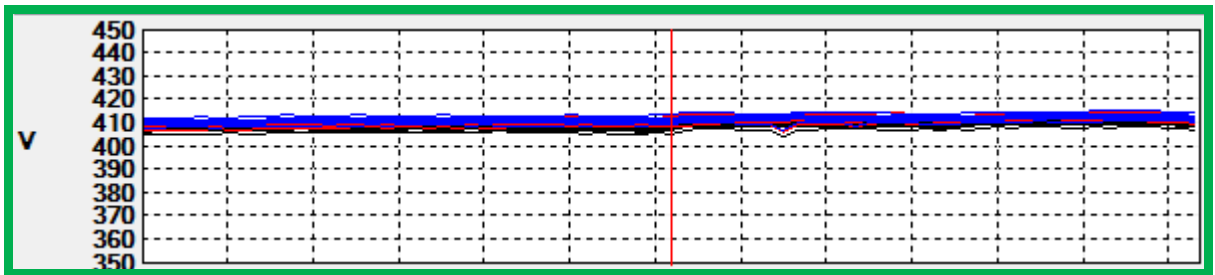


### B2-For-Library Information Science (SS-A)

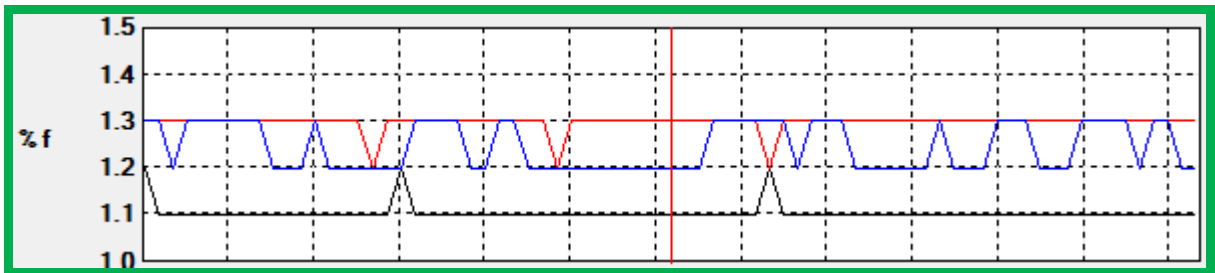
Frequency



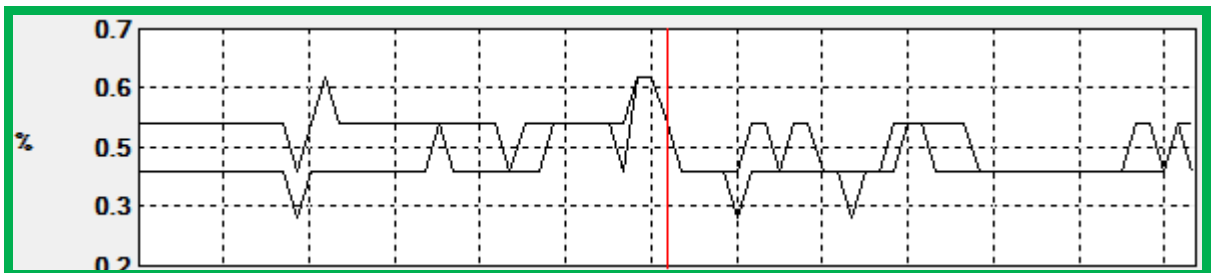
Voltage



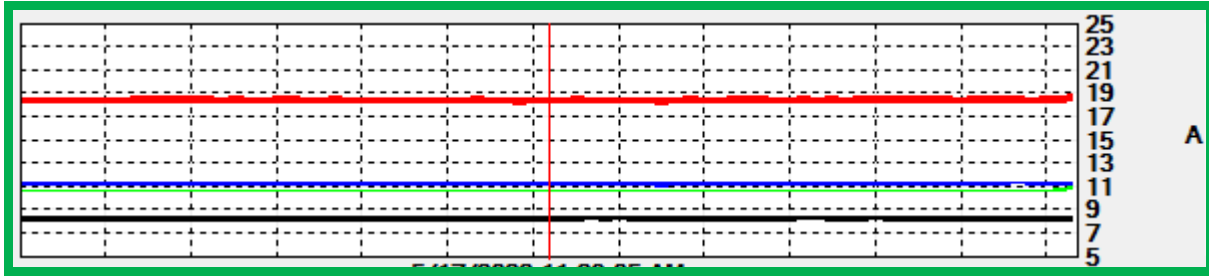
Voltage Harmonics



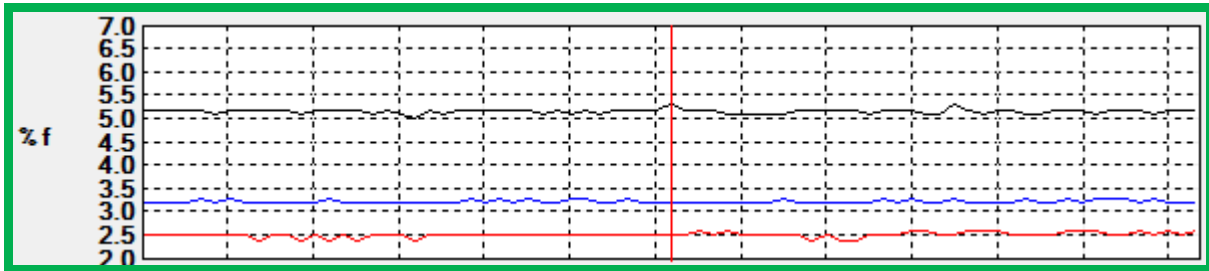
Voltage Un-balance



Current



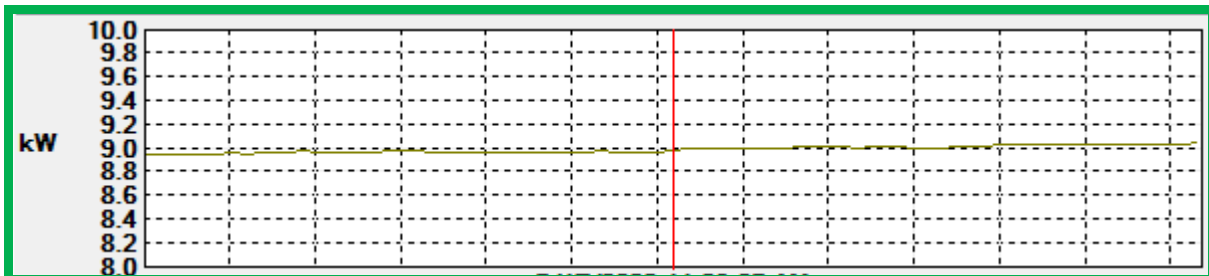
Current Harmonics



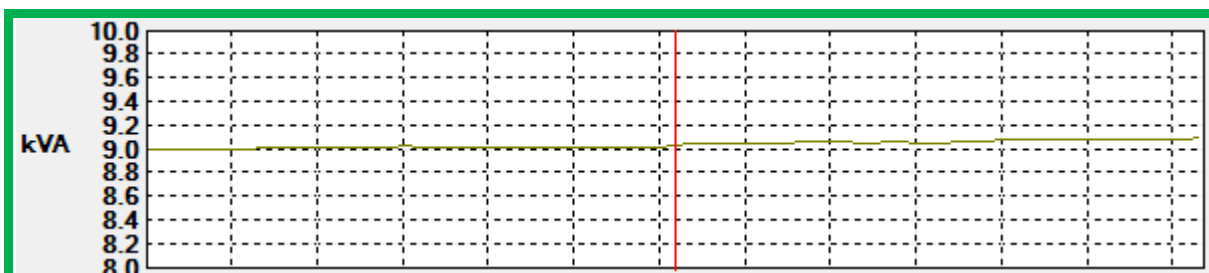
Current Un-balance



Power in KW

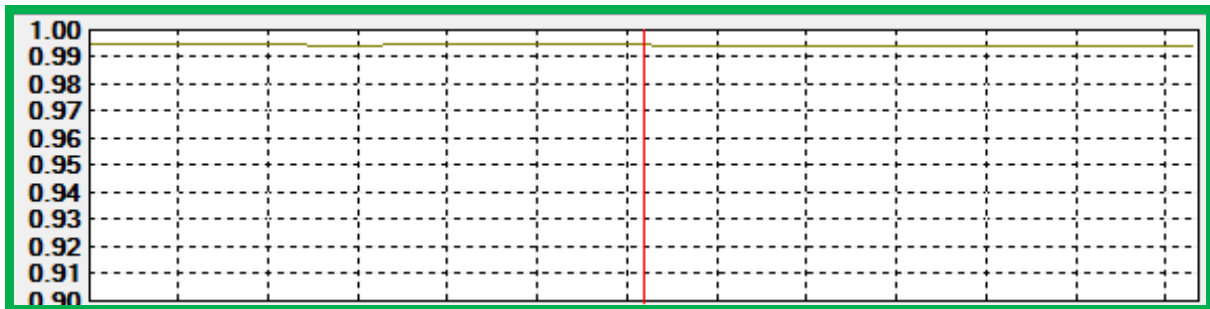


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	407.00	409.10	410.10	8.30	18.43	11.34	0.98	1.00	1.00	49.85	0.30	45.10
MAX	410.40	412.90	413.20	8.35	18.62	11.37	0.98	1.00	1.00	49.99	0.60	45.90
AVG	408.75	411.04	411.68	8.33	18.48	11.36	0.98	1.00	1.00	49.91	0.42	45.25

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.00	1.00	1.20	1.20	1.10	5.00	2.40	3.20
MAX	---	---	---	1.00	1.00	1.00	1.20	1.30	1.20	5.30	2.60	3.30
AVG	---	---	---	1.00	1.00	1.00	1.20	1.29	1.14	5.17	2.51	3.23

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.50	1.40	1.46



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

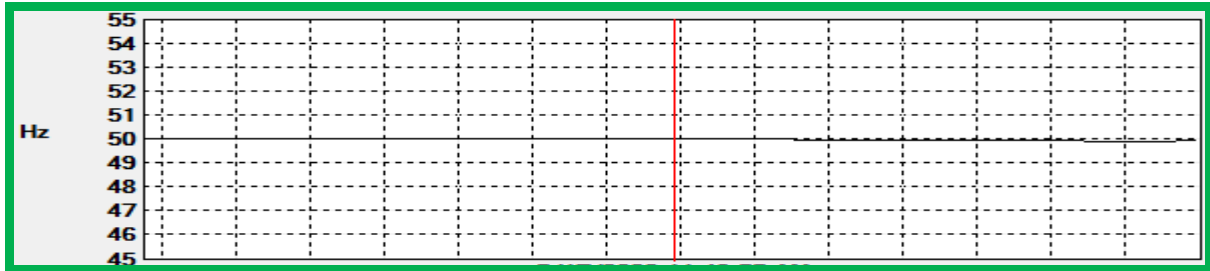


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.43	1.43	1.51	1.41	1.47
AVG	1.43	1.43	1.43	1.50	1.41	1.47



**B3-For-Botany Over Head, Urdu and Hindi Dept. (SS-A)**

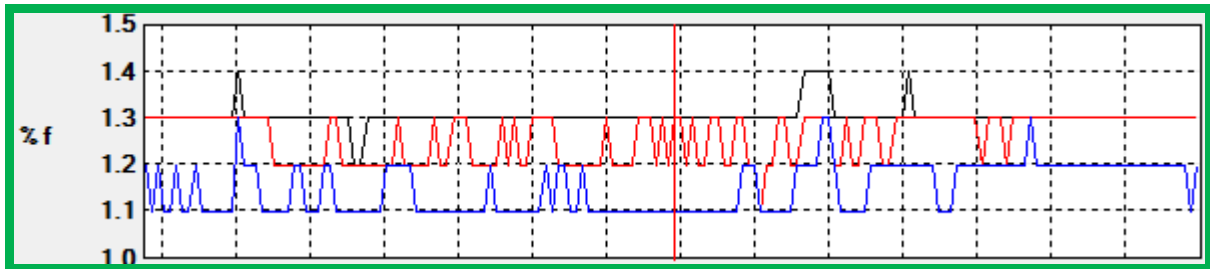
Frequency



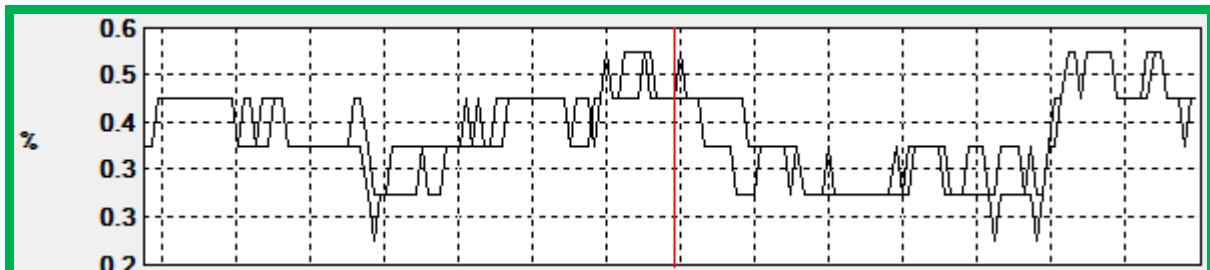
Voltage



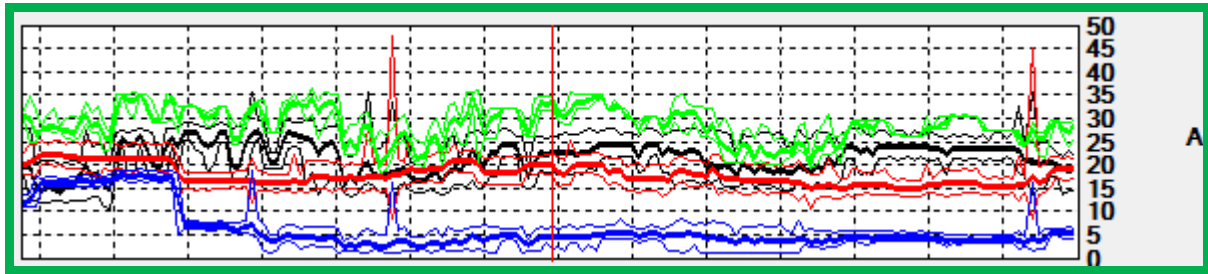
Voltage Harmonics



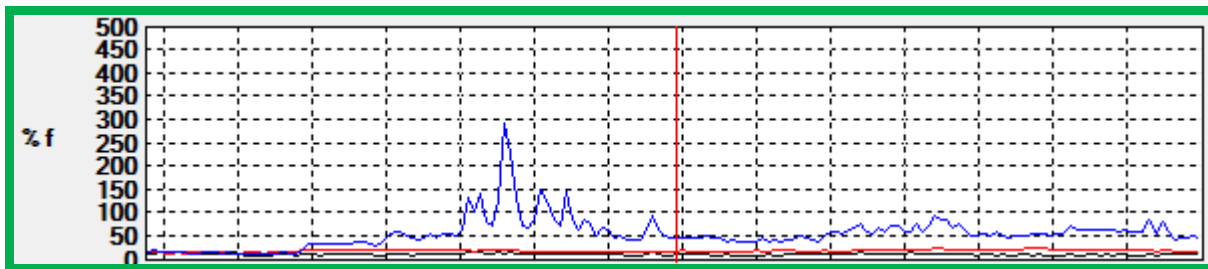
Voltage Un-balance



Current



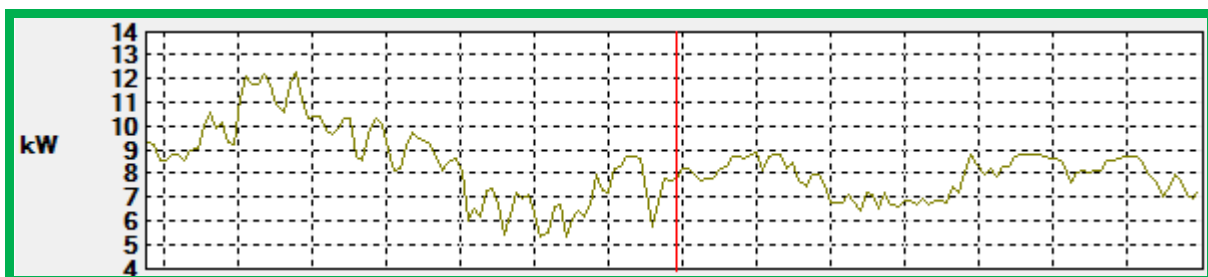
Current Harmonics



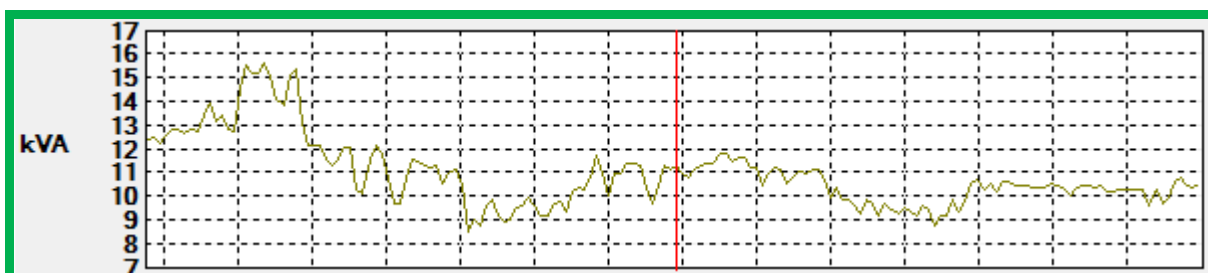
Current Un-balance



Power in KW



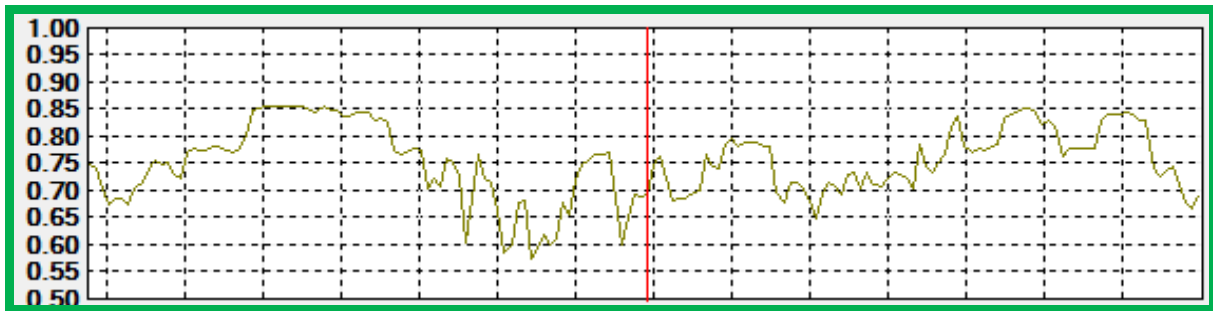
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	411.10	409.30	407.40	14.38	14.97	2.43	0.70	0.31	0.05	49.92	0.30	10.70
MAX	413.20	413.80	411.30	27.69	22.55	17.99	0.99	0.78	0.94	50.04	0.60	80.60
AVG	412.39	412.21	409.69	21.70	18.05	6.37	0.95	0.53	0.67	50.00	0.43	61.81

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.03	1.03	0.61	1.00	1.02	1.02	1.20	1.10	1.20	9.20	14.50	13.50
MAX	1.03	1.03	0.61	1.03	1.06	1.64	1.40	1.30	1.30	17.90	25.60	293.40
AVG	1.03	1.03	0.61	1.01	1.04	1.20	1.29	1.15	1.25	12.25	19.44	55.98

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.54	1.77	1.49



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.44	1.44	1.43	2.03	2.62	4.23
AVG	1.43	1.43	1.43	1.72	1.98	2.37

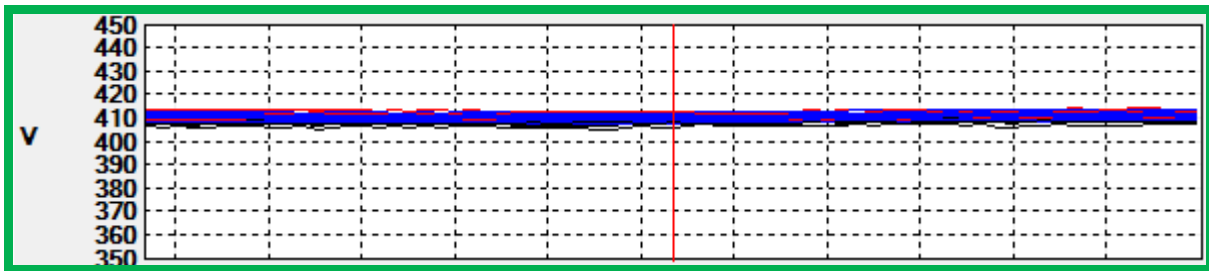


**B4-For-RANI LAXMI BAI HOSTEL (SS-A)**

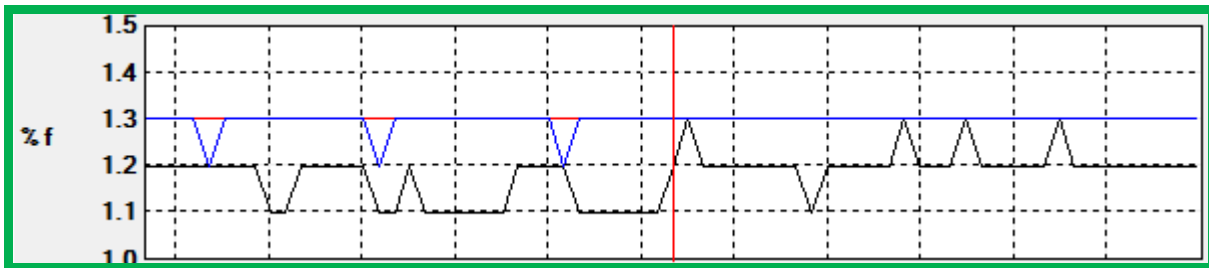
Frequency



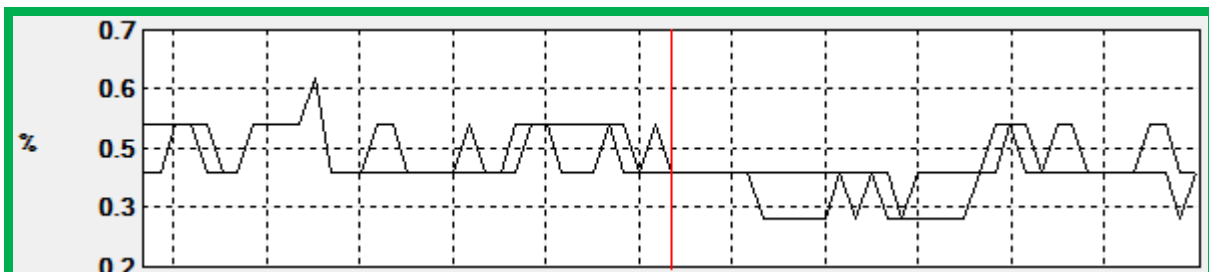
Voltage



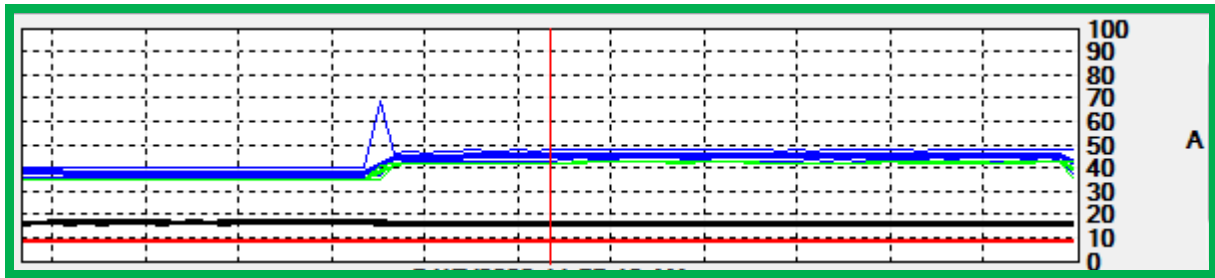
Voltage Harmonics



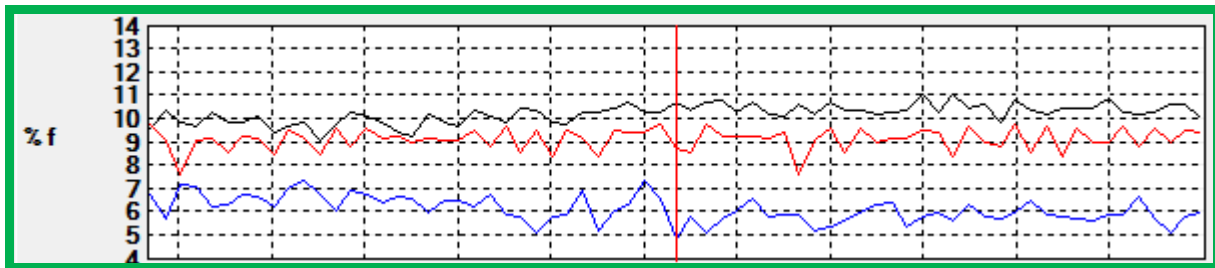
Voltage Un-balance



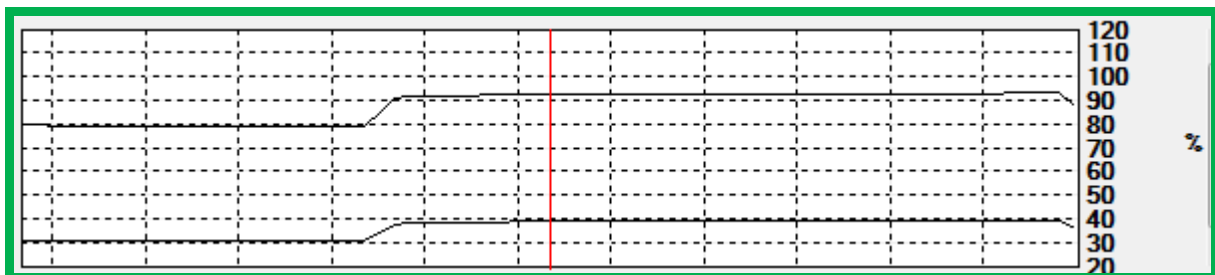
Current



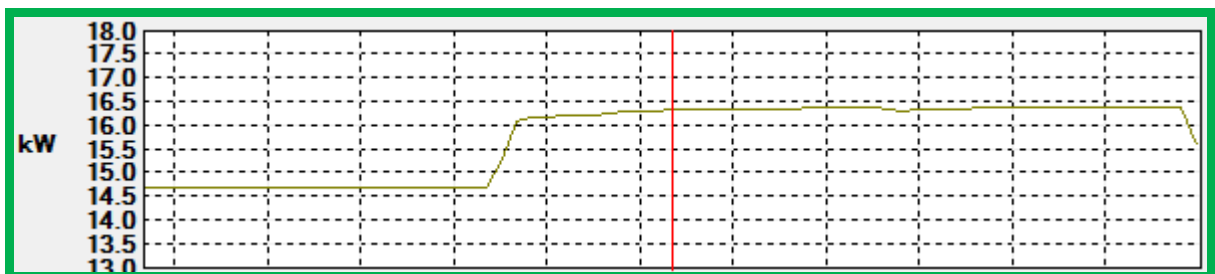
Current Harmonics



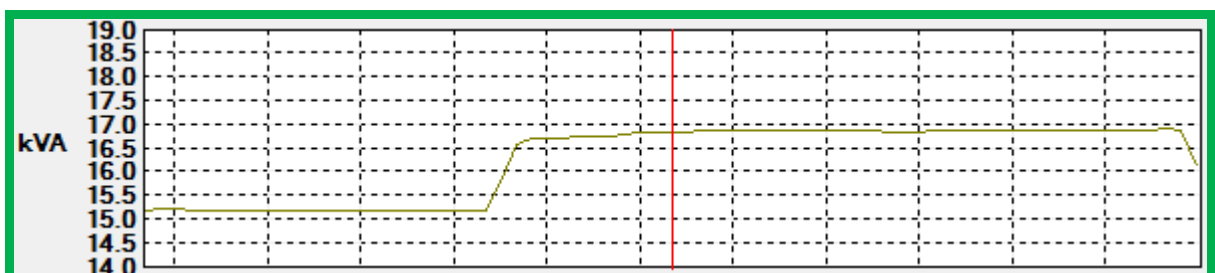
Current Un-balance



Power in KW

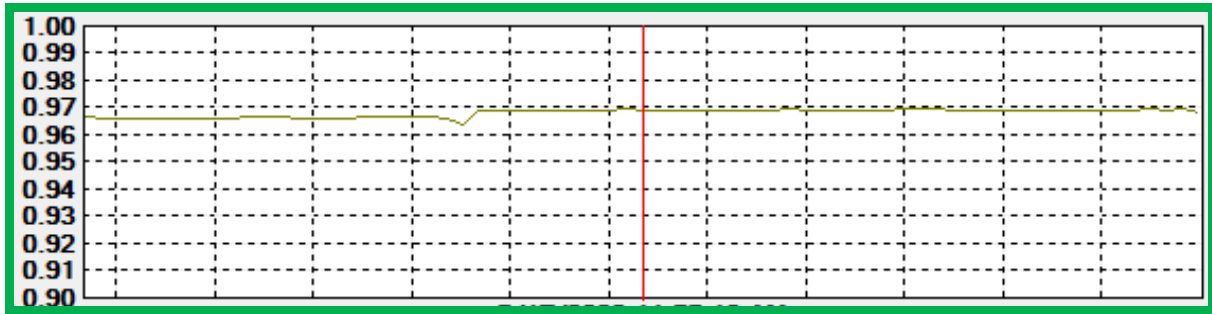


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	407.60	411.00	410.10	16.22	8.84	38.28	0.91	0.98	0.98	49.98	0.30	79.30
MAX	409.70	412.40	411.90	16.91	8.99	45.89	0.92	0.99	0.99	50.03	0.60	93.70
AVG	408.71	411.58	410.87	16.52	8.93	43.08	0.92	0.99	0.98	50.01	0.41	88.30

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.03	1.03	0.61	1.00	1.01	1.00	1.20	1.20	1.10	9.10	7.60	4.90
MAX	3.91	3.41	3.57	1.00	1.01	1.00	1.30	1.30	1.30	11.10	9.80	7.40
AVG	1.35	1.29	0.94	1.00	1.01	1.00	1.24	1.29	1.18	10.24	9.14	6.12

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.51	1.53	1.50



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

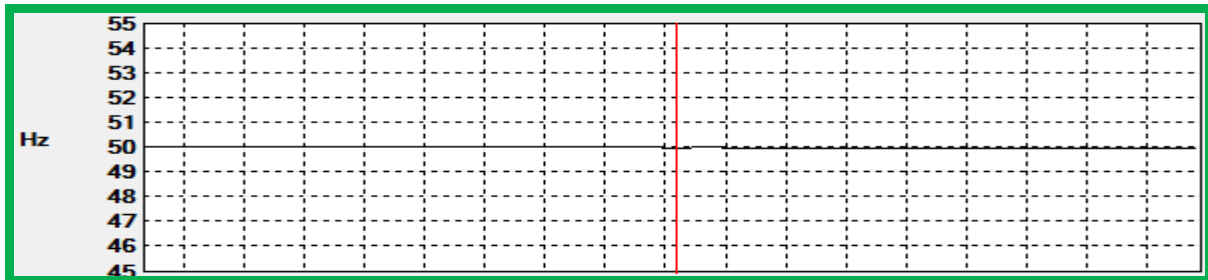


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.44	1.43	1.53	1.57	1.68
AVG	1.43	1.43	1.43	1.52	1.54	1.52

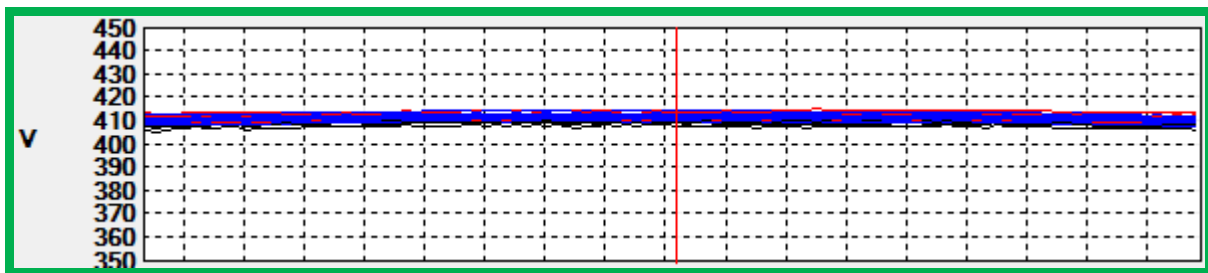


### B5-For-New Girls Hostel (SS-A)

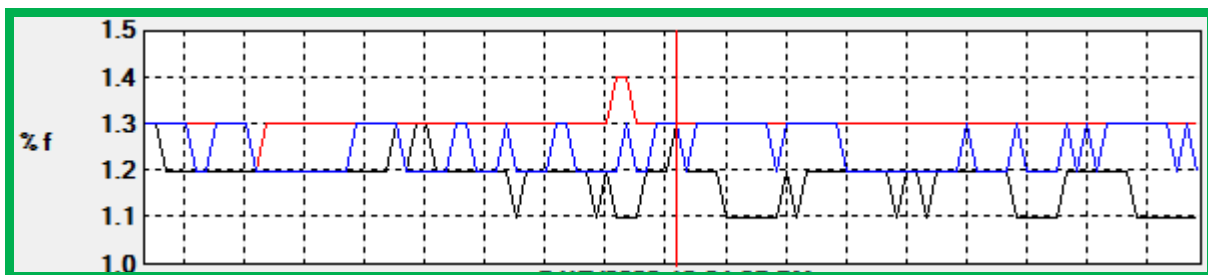
Frequency



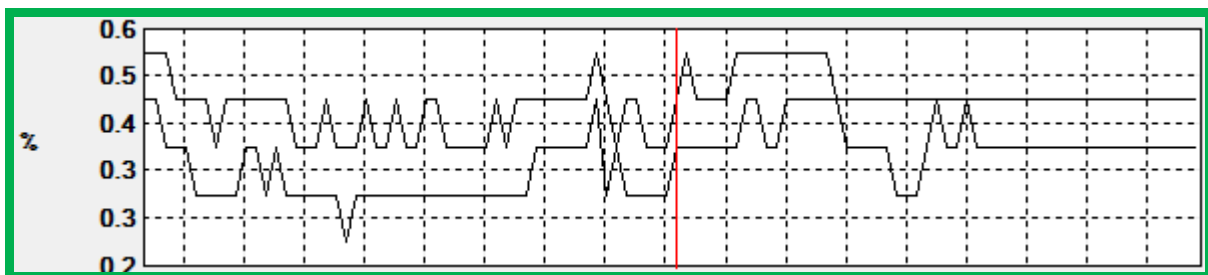
Voltage



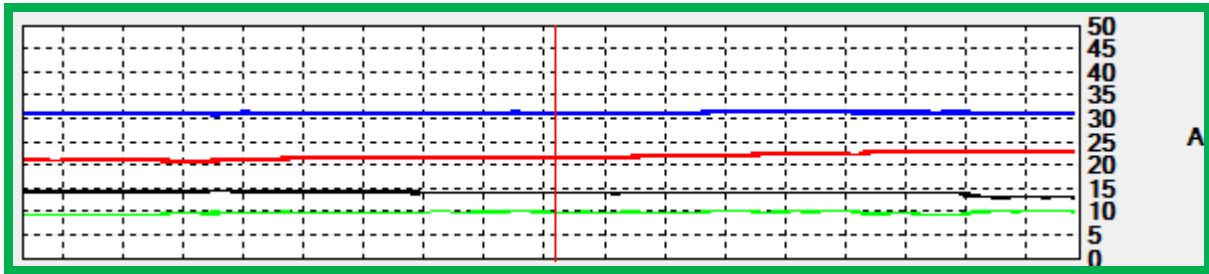
Voltage Harmonics



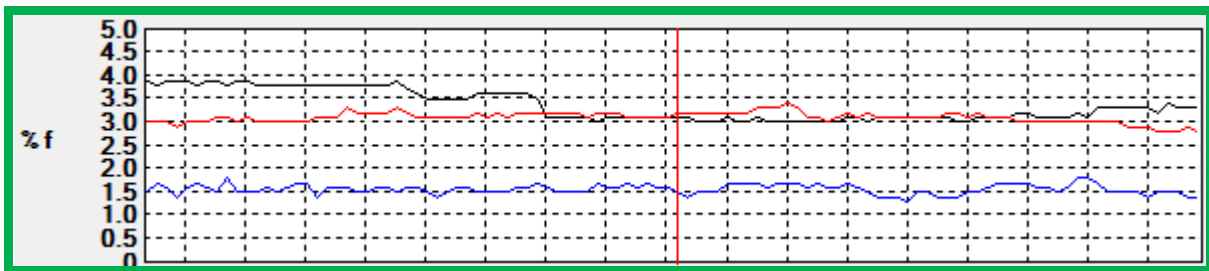
Voltage Un-balance



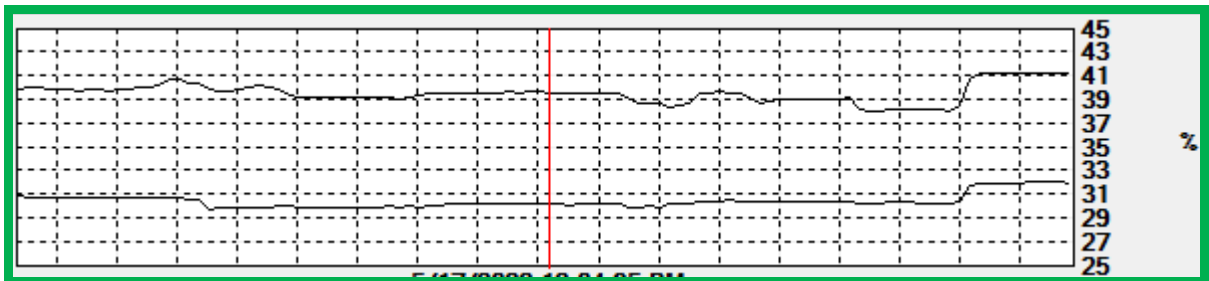
Current



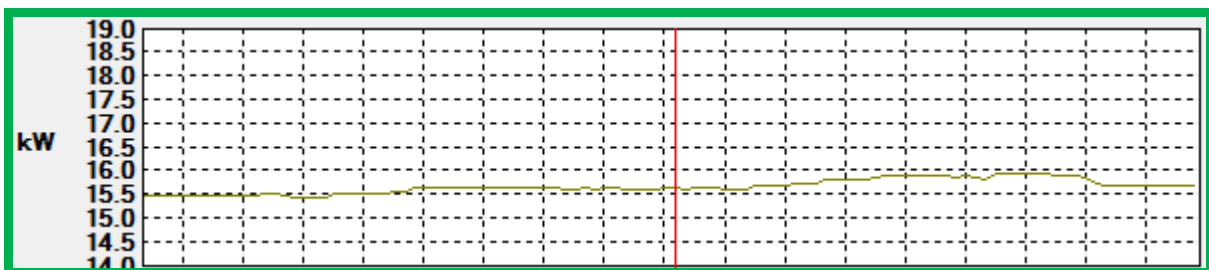
Current Harmonics



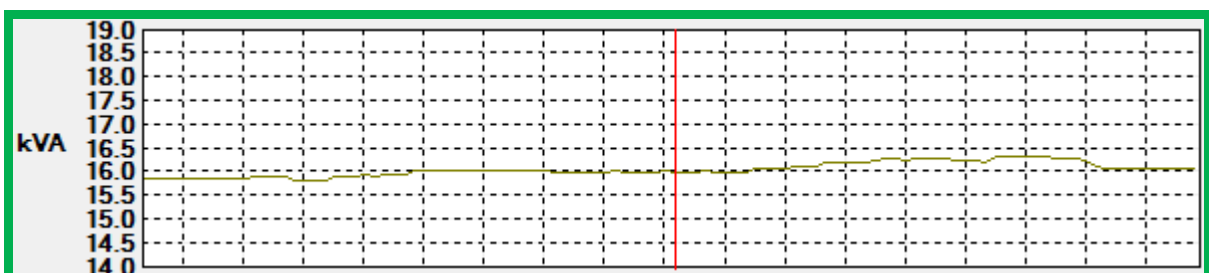
Current Un-balance



Power in KW



Power in KVA







**Power Factor**



**Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance**

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	408.00	411.20	410.00	13.25	20.86	31.15	0.98	1.00	0.96	49.96	0.20	38.10
MAX	410.50	413.00	412.60	14.57	23.15	31.74	0.98	1.00	0.96	50.06	0.50	41.30
AVG	409.60	412.28	411.64	14.18	22.02	31.36	0.98	1.00	0.96	50.01	0.38	39.57

**Min, Average & Max Rang of Flickering, "K" Factor & Harmonics**

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	3.91	3.41	3.57	1.00	1.00	1.00	1.20	1.20	1.10	3.00	2.80	1.30
MAX	3.91	3.41	3.57	1.00	1.00	1.00	1.30	1.30	1.20	3.90	3.40	1.80
AVG	3.91	3.41	3.57	1.00	1.00	1.00	1.27	1.28	1.16	3.35	3.10	1.57

**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.42	1.39	1.42



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

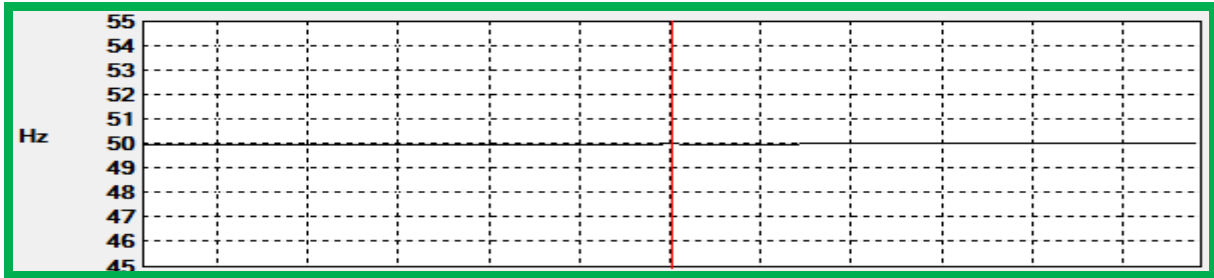


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.44	1.44	1.43	1.45	1.41	1.46
AVG	1.43	1.44	1.43	1.43	1.39	1.43

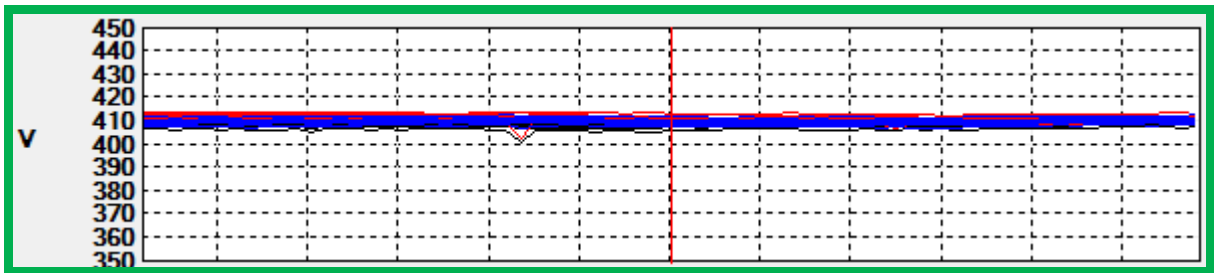


### B6-For-Durga Bhabhi Hostel OVERHEAD (SS-A)

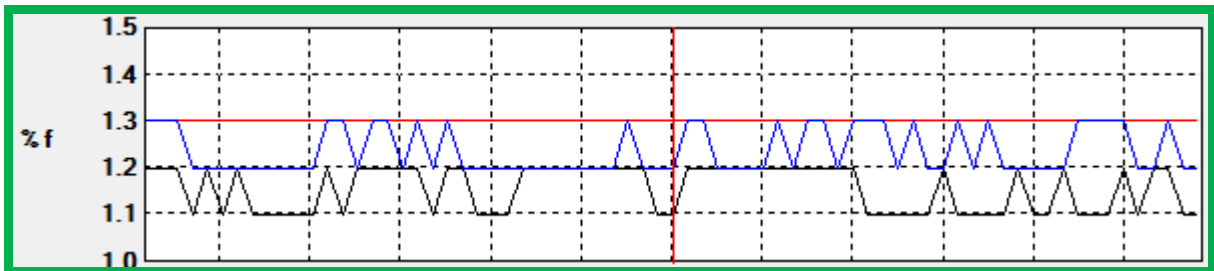
Frequency



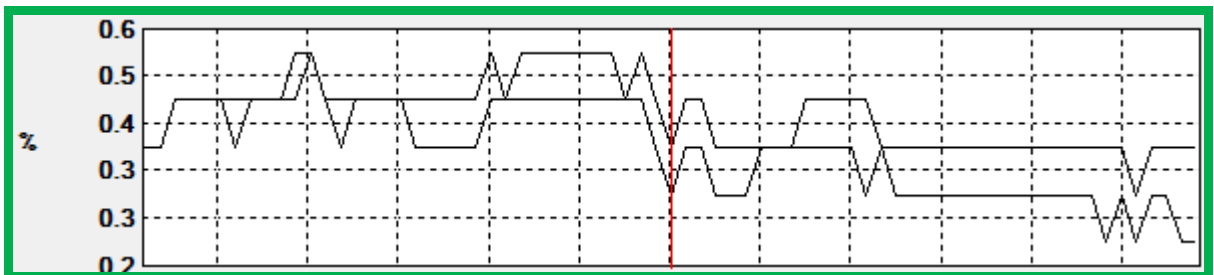
Voltage



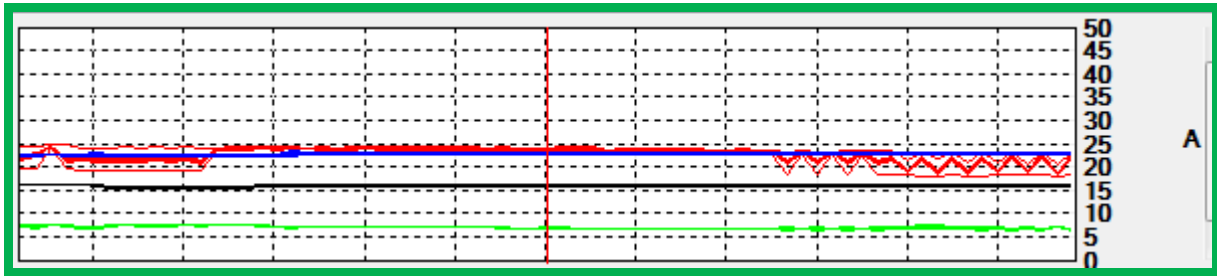
Voltage Harmonics



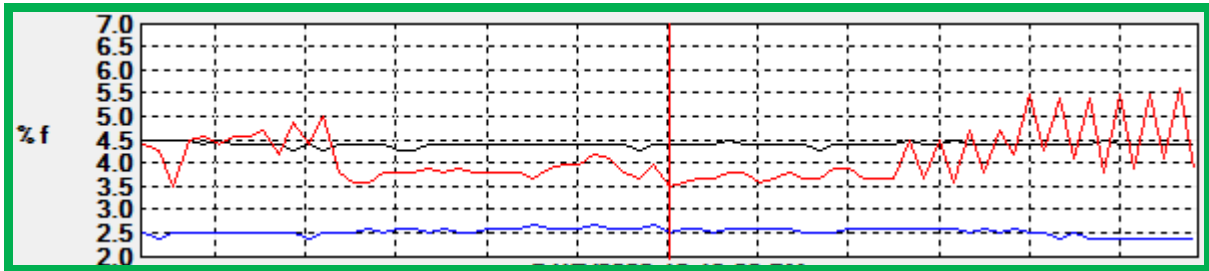
Voltage Un-balance



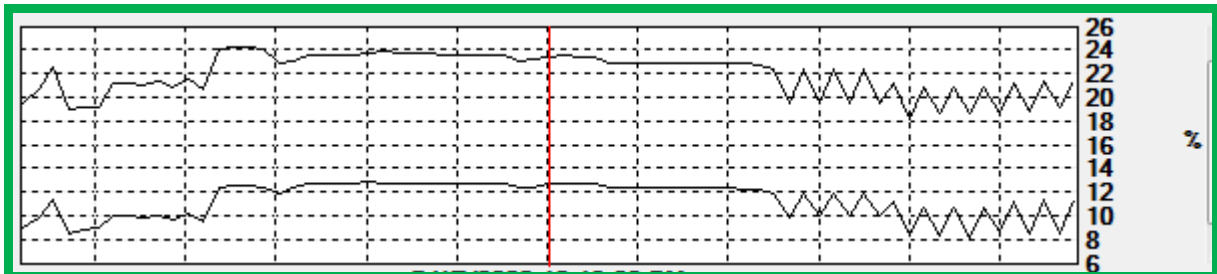
Current



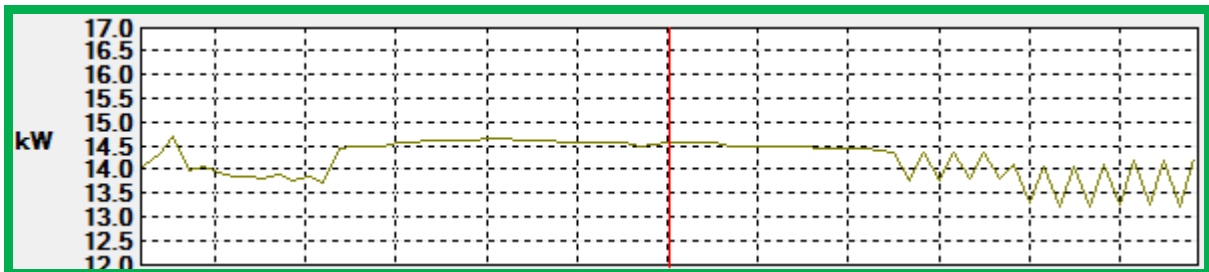
Current Harmonics



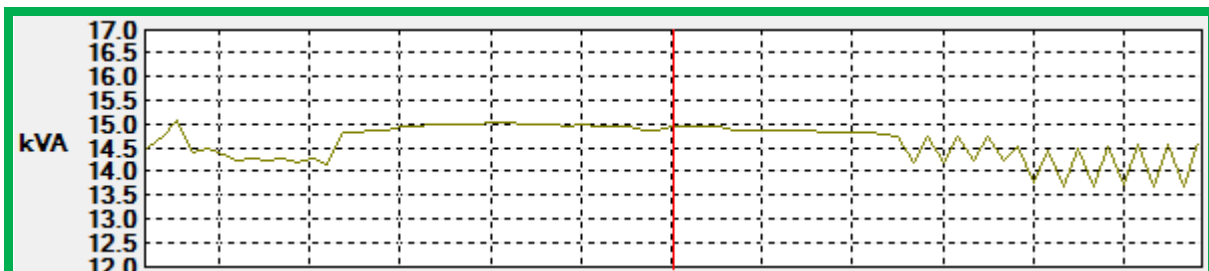
Current Un-balance



Power in KW

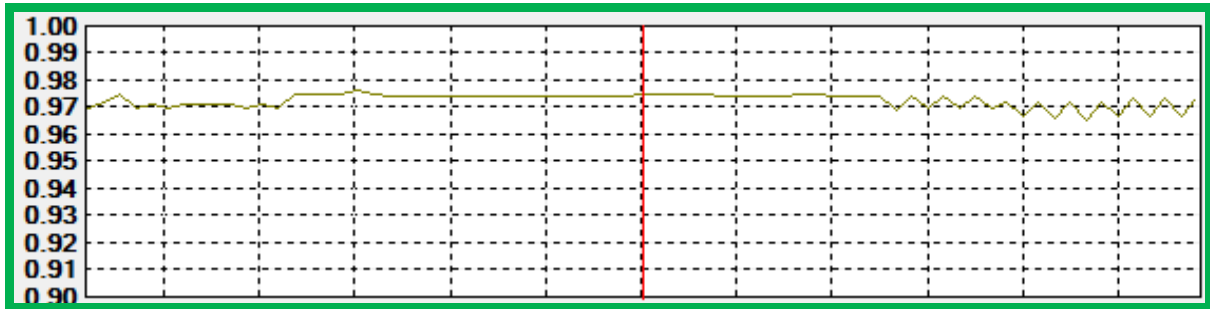


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	407.70	410.50	409.10	15.76	18.68	22.70	0.97	0.95	0.97	49.95	0.20	18.20
MAX	409.60	412.20	410.60	16.44	24.40	23.20	0.97	0.98	0.98	50.04	0.60	24.30
AVG	408.52	411.39	409.90	16.10	22.73	23.01	0.97	0.97	0.98	49.99	0.36	22.05

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.00	1.00	1.20	1.20	1.10	4.30	3.50	2.40
MAX	---	---	---	1.00	1.00	1.00	1.30	1.30	1.30	4.50	5.60	2.70
AVG	---	---	---	1.00	1.00	1.00	1.24	1.29	1.17	4.40	4.13	2.54

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.43	1.38	1.43



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.44	1.44	1.43	1.45	1.46	1.49
AVG	1.43	1.43	1.43	1.44	1.41	1.47

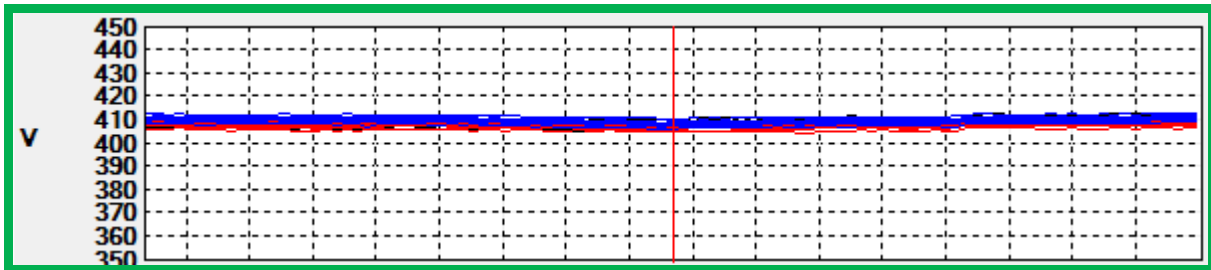


### B7-For-New Park

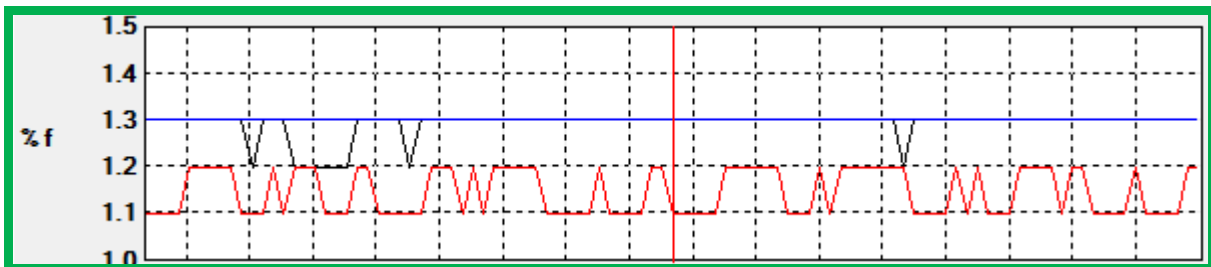
Frequency



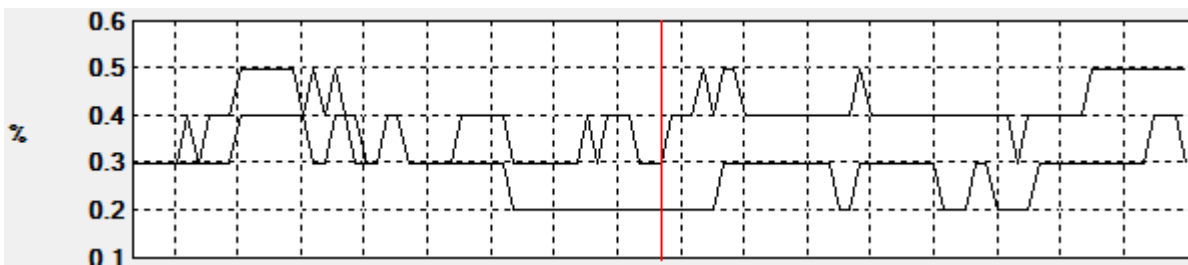
Voltage



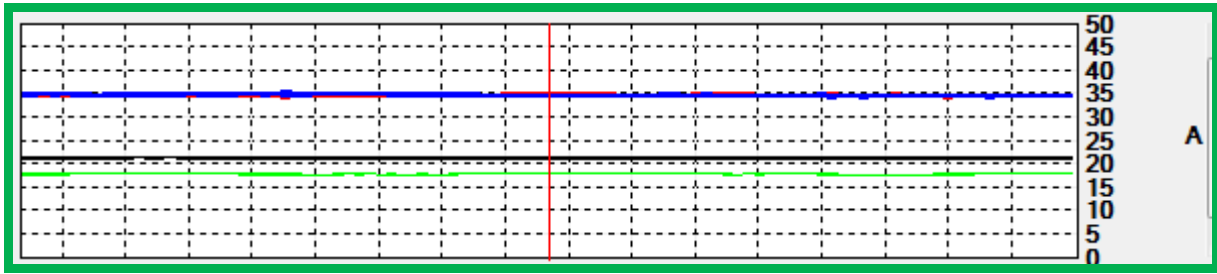
Voltage Harmonics



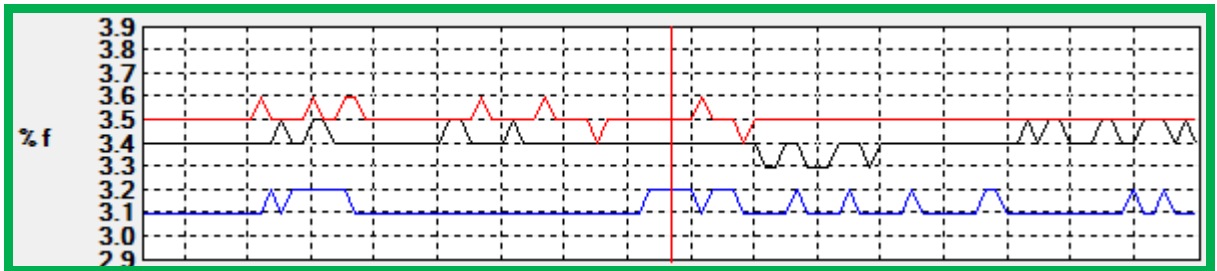
Voltage Un-balance



Current



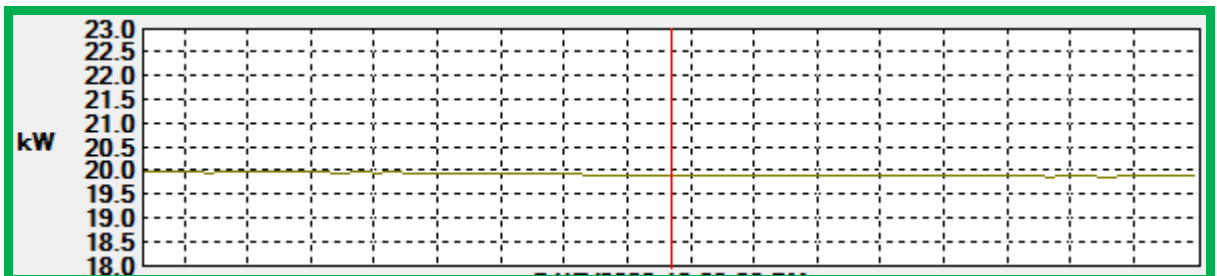
Current Harmonics



Current Un-balance



Power in KW



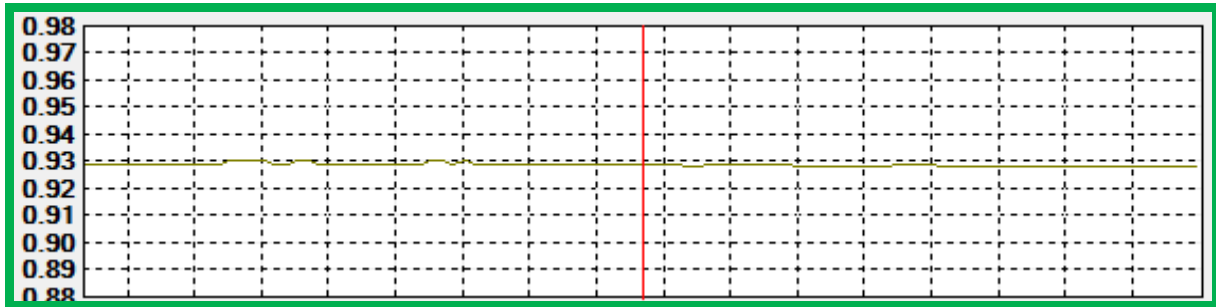
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	407.80	406.70	408.00	21.23	34.59	34.55	1.00	0.90	0.91	49.91	0.20	29.10
MAX	410.50	408.90	411.20	21.50	35.01	35.02	1.00	0.90	0.92	49.99	0.40	29.80
AVG	409.00	407.83	409.89	21.38	34.75	34.79	1.00	0.90	0.91	49.93	0.29	29.46

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.12	1.74	1.23	1.00	1.00	1.00	1.10	1.20	1.20	3.30	3.40	3.10
MAX	1.12	1.74	1.23	1.00	1.00	1.00	1.20	1.30	1.30	3.50	3.60	3.20
AVG	1.12	1.74	1.23	1.00	1.00	1.00	1.20	1.23	1.27	3.41	3.50	3.12

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.44	1.45	1.46



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

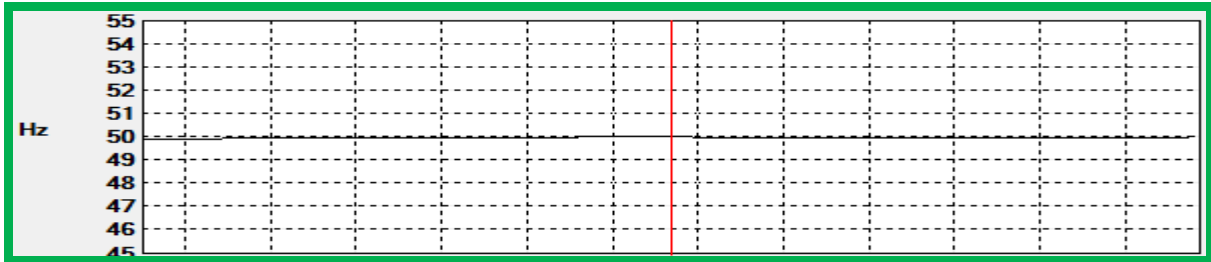


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.44	1.44	1.45	1.46	1.47
AVG	1.43	1.43	1.43	1.45	1.46	1.46

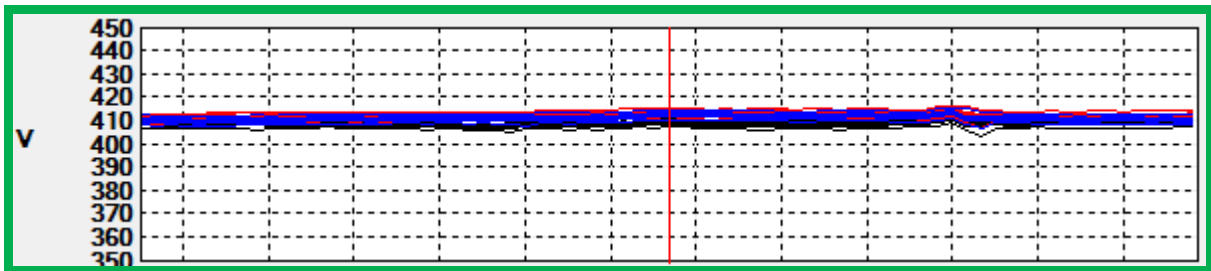


**B8-For- Zoology Dept. and Old Tube well (SS-A)**

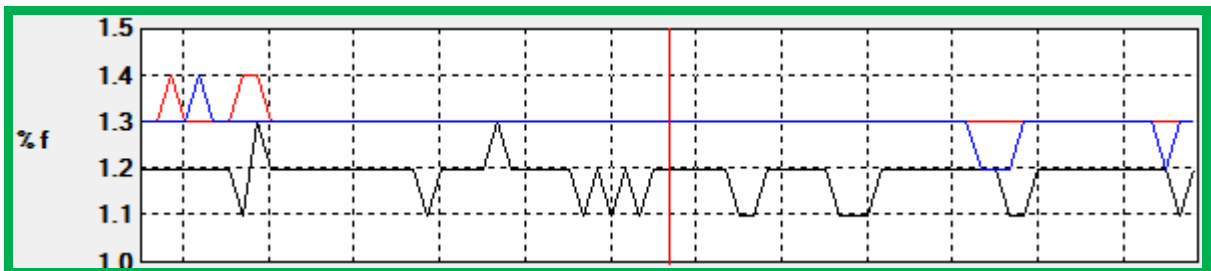
Frequency



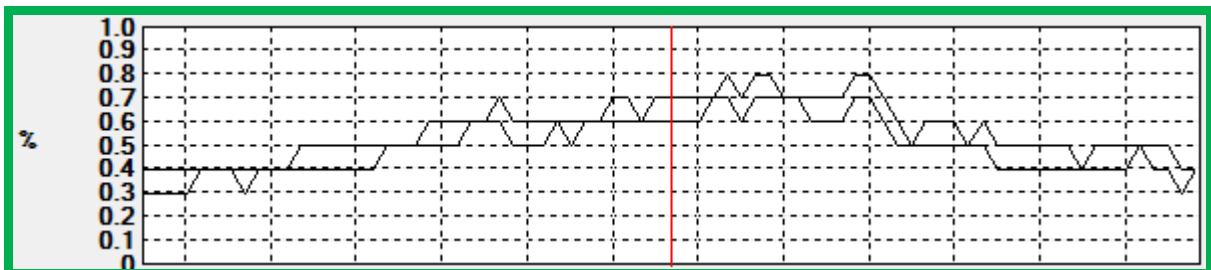
Voltage



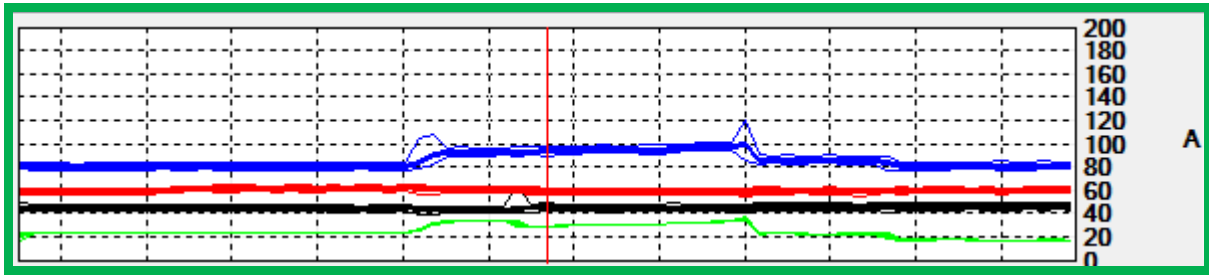
Voltage Harmonics



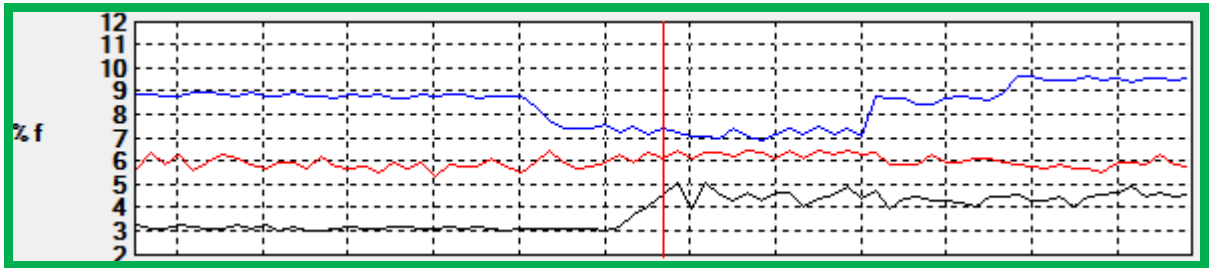
Voltage Un-balance



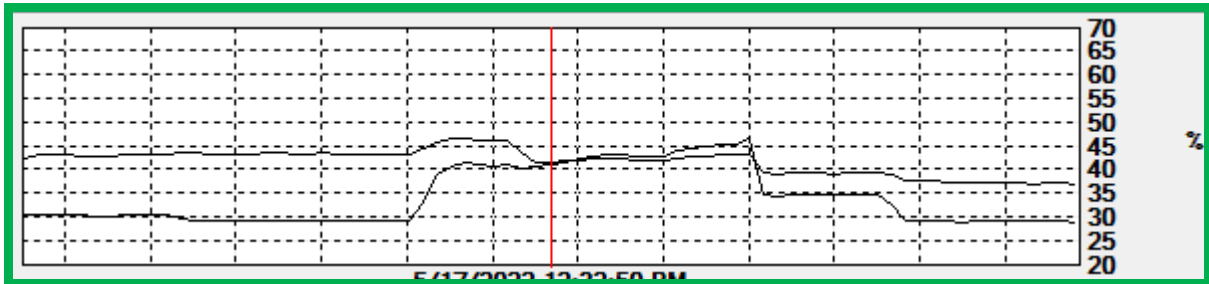
Current



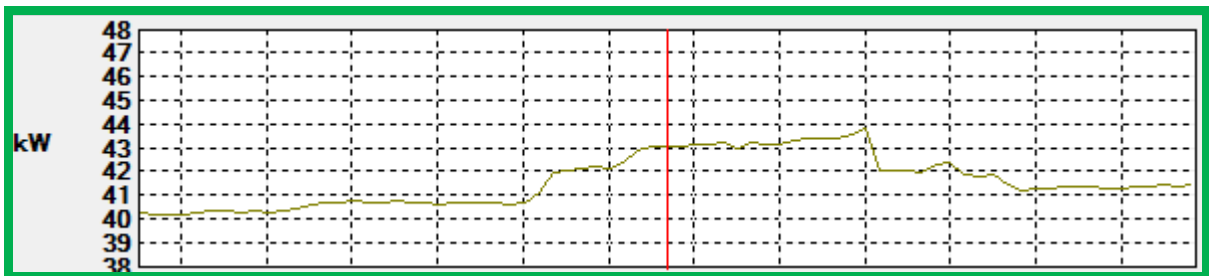
Current Harmonics



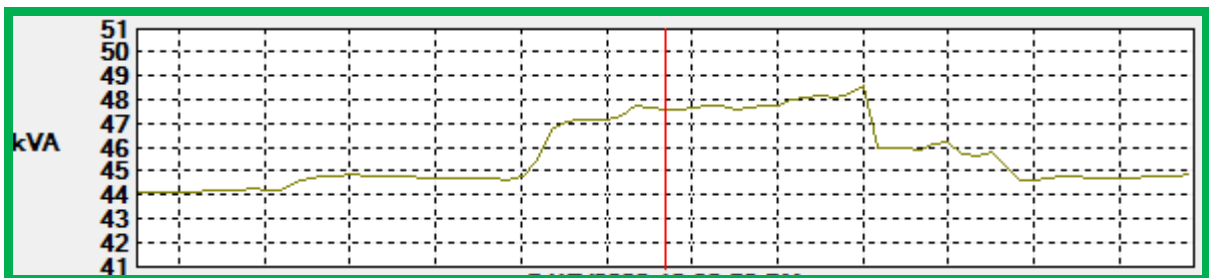
Current Un-balance



Power in KW

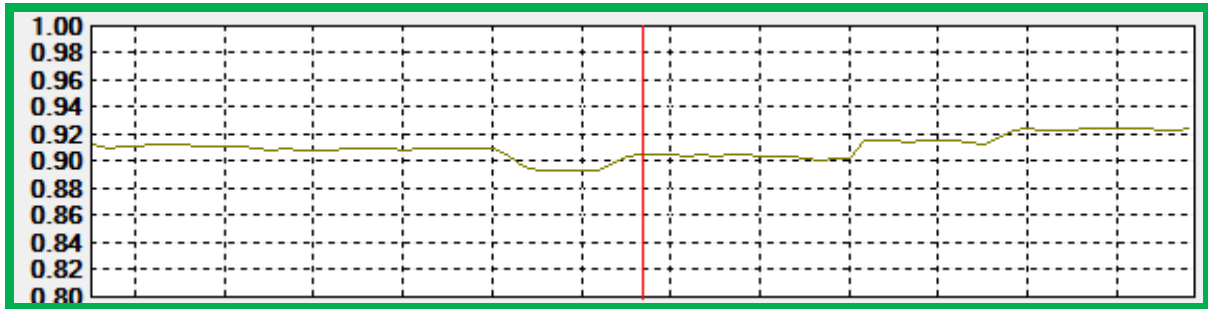


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	408.00	411.00	409.80	44.10	59.05	80.98	0.93	0.82	0.91	49.92	0.30	29.10
MAX	410.90	414.30	413.40	47.09	62.28	99.79	0.98	0.84	0.96	50.02	0.70	46.60
AVG	408.91	412.45	411.35	45.67	60.57	86.32	0.95	0.83	0.94	49.98	0.49	34.31

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.00	1.00	1.20	1.20	1.10	3.00	5.40	6.90
MAX	---	---	---	1.00	1.00	1.00	1.30	1.40	1.30	5.10	6.50	9.70
AVG	---	---	---	1.00	1.00	1.00	1.26	1.29	1.20	3.84	6.01	8.47

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.42	1.46	1.52	1.58



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

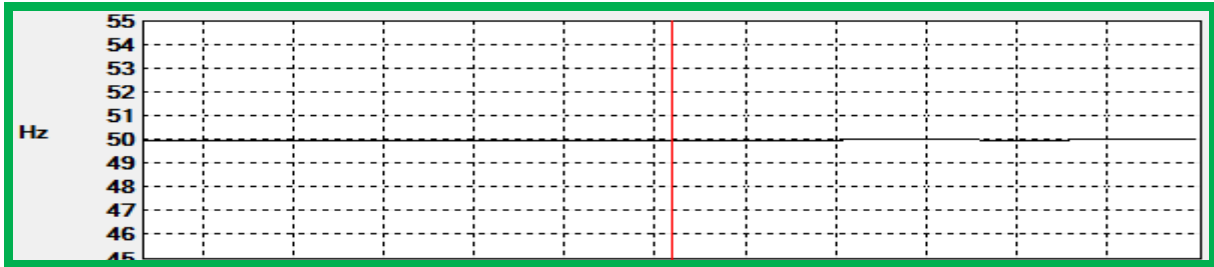


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.44	1.43	1.57	1.57	1.70
AVG	1.43	1.43	1.43	1.48	1.54	1.62

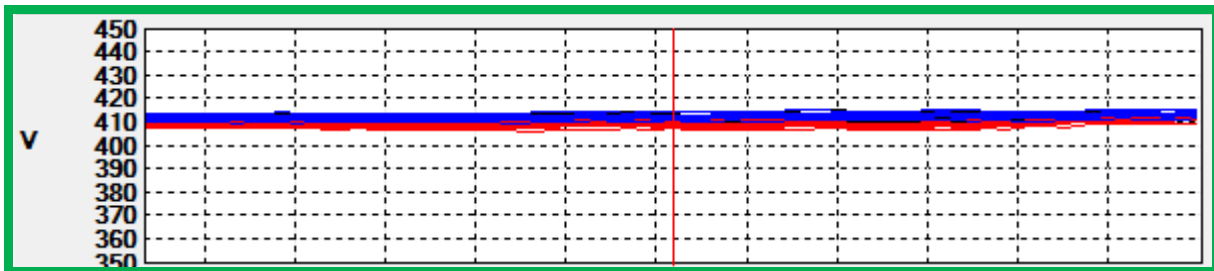


**B9-For-VC OFFICE (SS-A)**

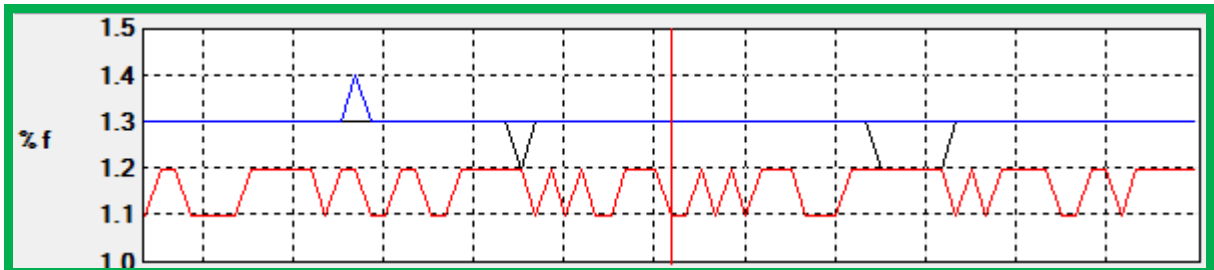
Frequency



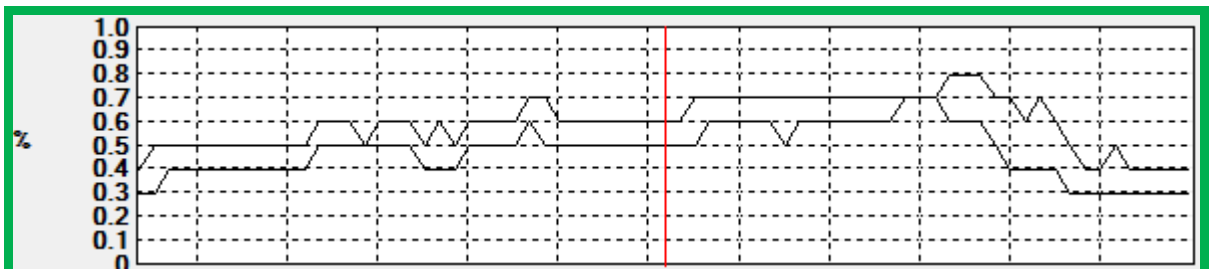
Voltage



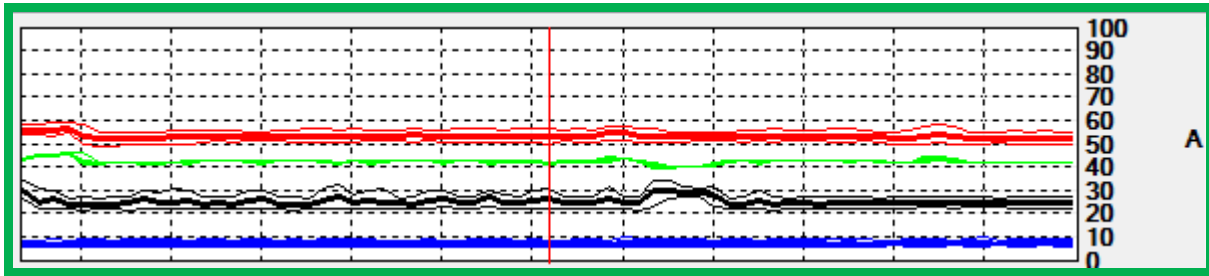
Voltage Harmonics



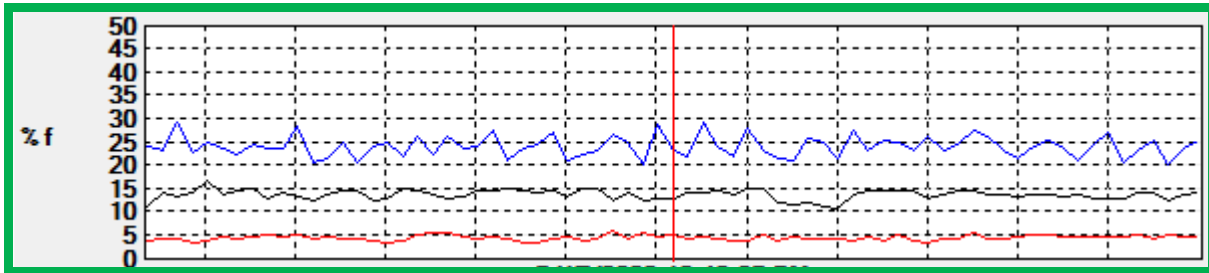
Voltage Un-balance



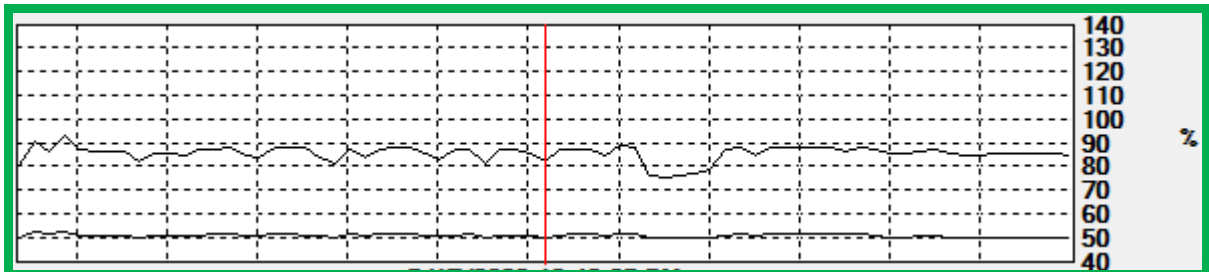
Current



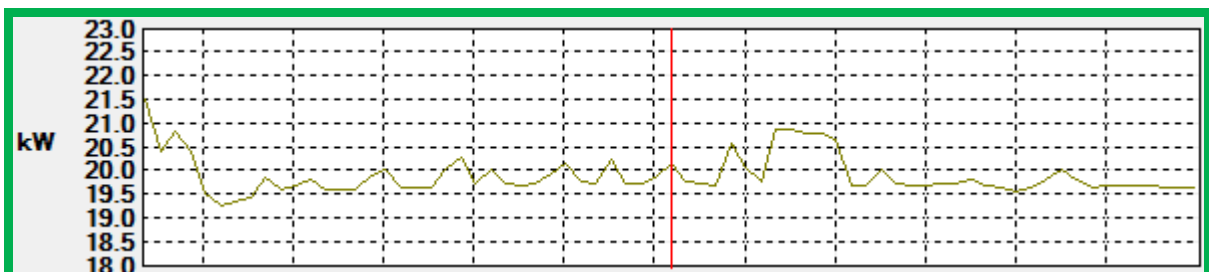
Current Harmonics



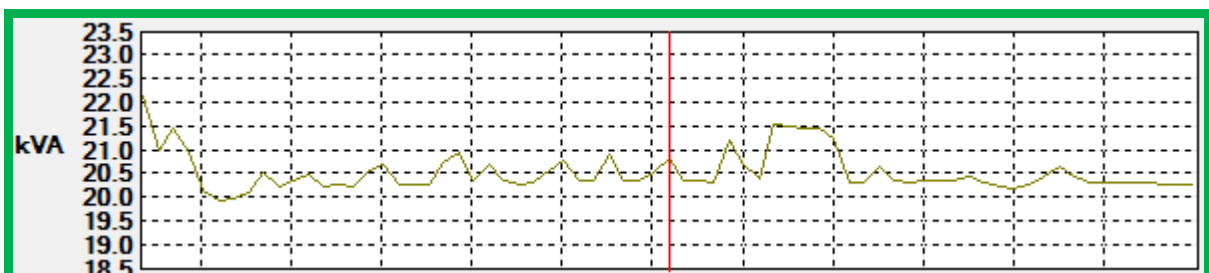
Current Un-balance



Power in KW



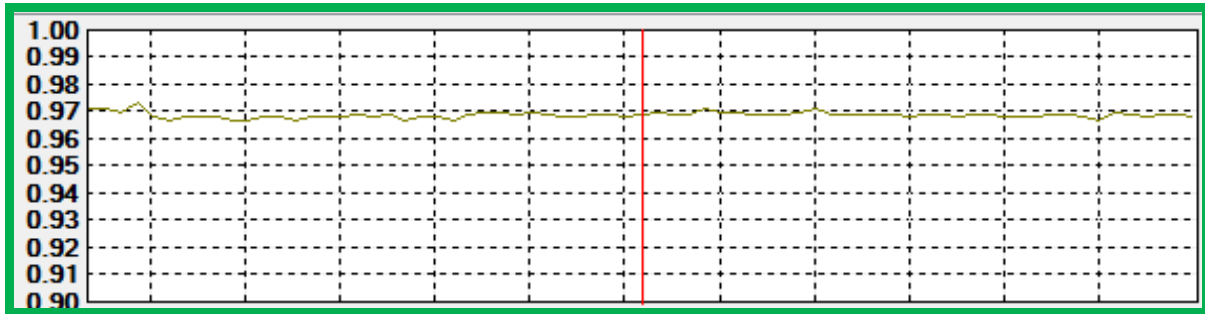
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	411.00	408.20	411.80	24.37	52.18	7.05	0.99	0.99	0.69	49.96	0.30	75.90
MAX	413.30	411.70	413.60	29.93	56.94	7.77	0.99	1.00	0.73	50.02	0.70	93.30
AVG	412.11	409.40	412.59	25.50	53.55	7.43	0.99	1.00	0.71	49.99	0.48	85.79

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.00	1.04	1.10	1.20	1.20	10.80	3.30	20.20
MAX	---	---	---	1.01	1.00	1.05	1.20	1.30	1.40	16.60	6.20	29.30
AVG	---	---	---	1.01	1.00	1.04	1.19	1.23	1.29	13.79	4.49	24.13

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.65	1.46	2.01



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

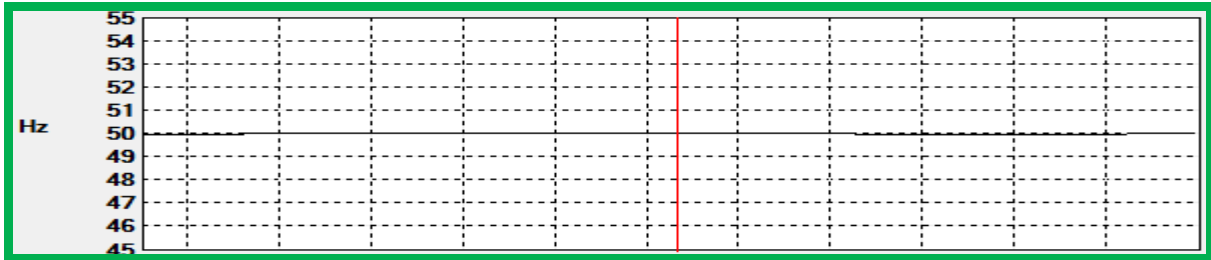


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.44	1.44	1.82	1.50	2.21
AVG	1.43	1.43	1.43	1.72	1.48	2.10

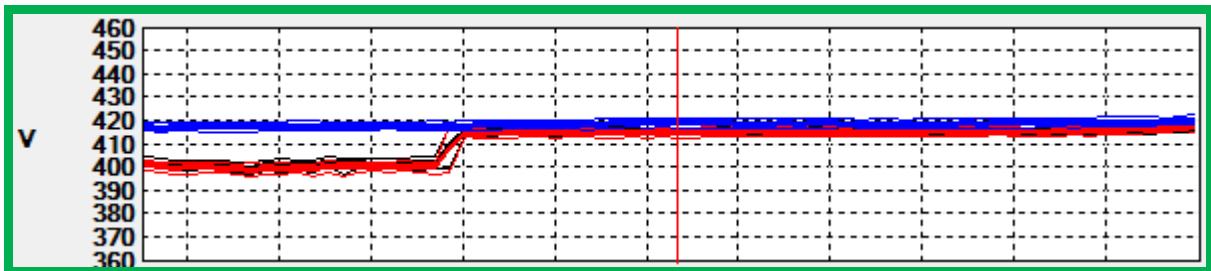


**B10-For-Secrecy Exam. Dept. (SS-A)**

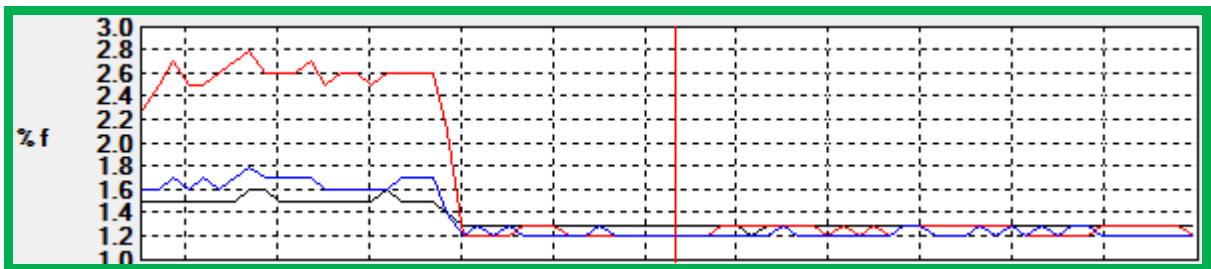
Frequency



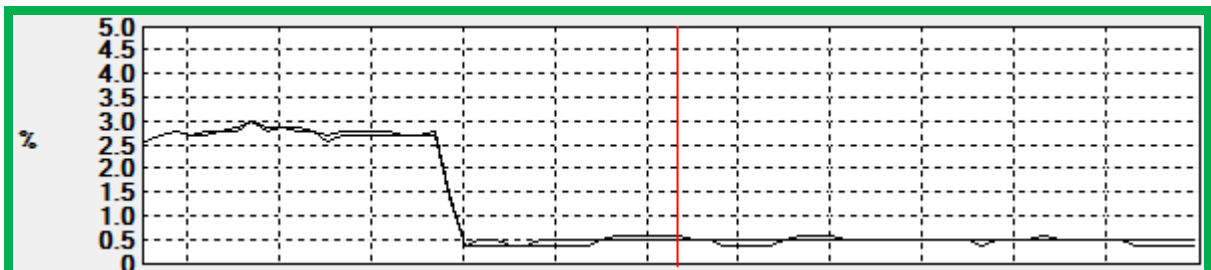
Voltage



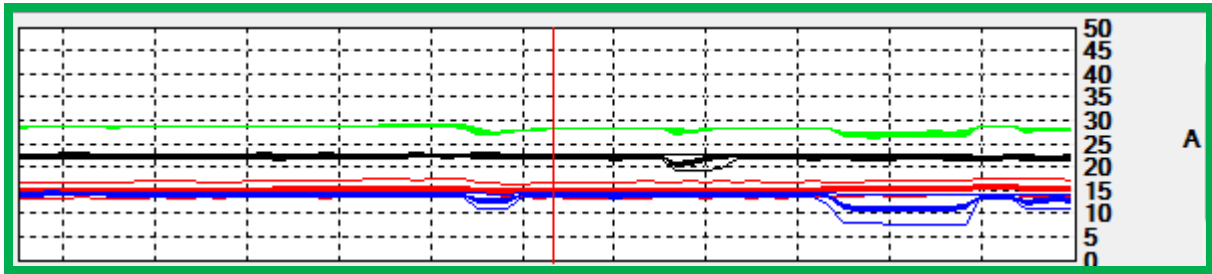
Voltage Harmonics



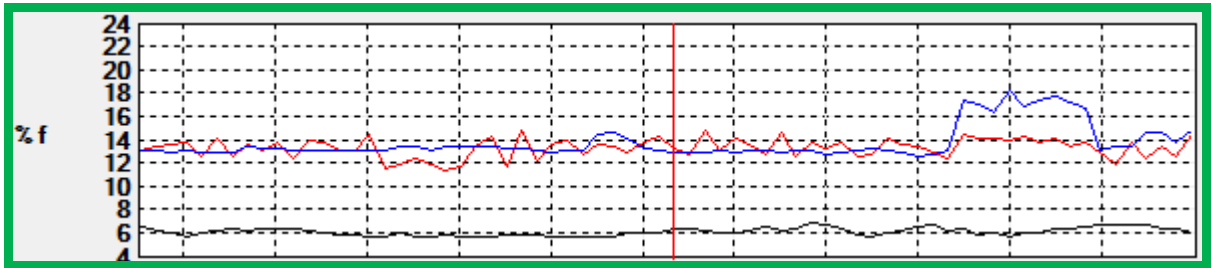
Voltage Un-balance



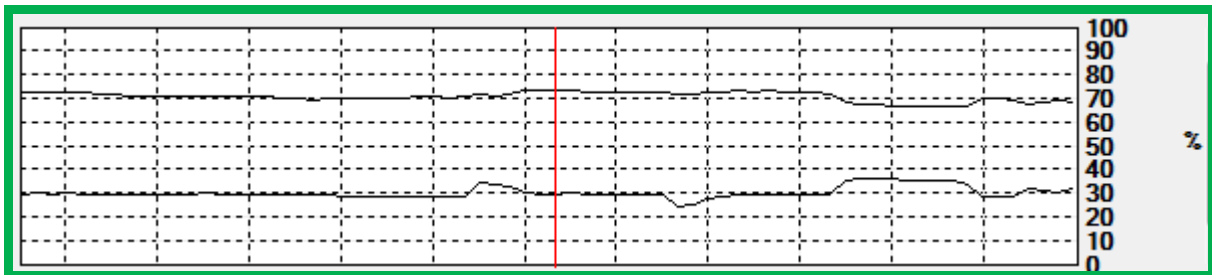
Current



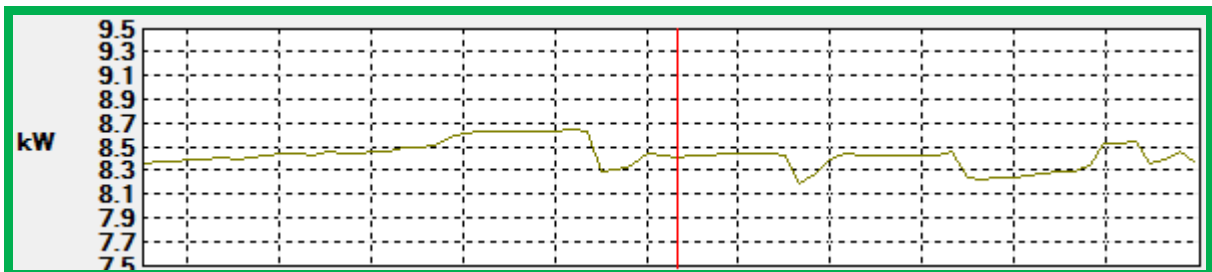
Current Harmonics



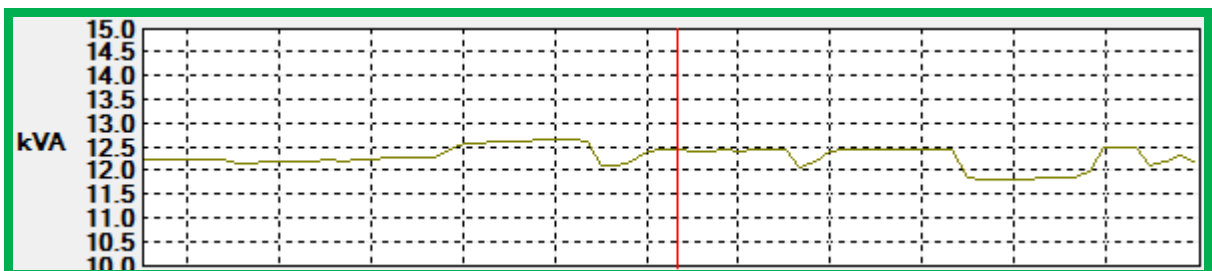
Current Un-balance



Power in KW

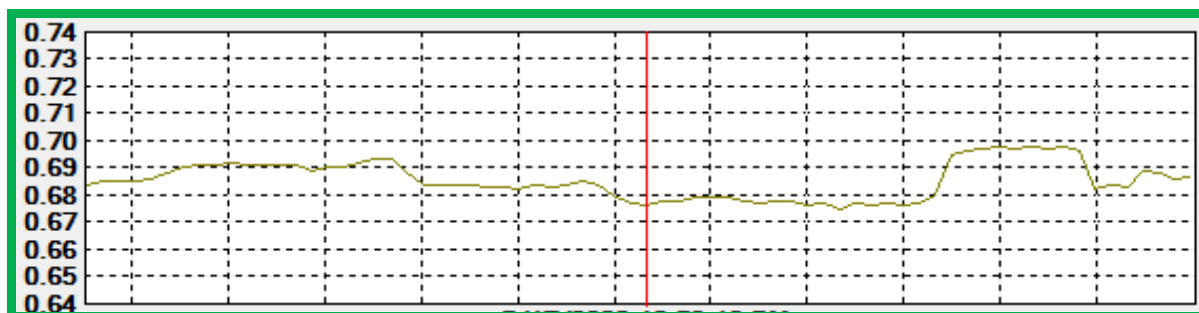


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	399.80	398.40	417.30	20.77	14.96	11.27	0.73	0.91	0.30	49.98	0.40	24.20
MAX	417.30	417.50	420.30	22.62	15.78	14.47	0.76	0.93	0.37	50.04	3.00	36.20
AVG	411.79	411.00	418.67	22.37	15.33	13.74	0.74	0.92	0.33	50.01	1.19	30.49

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.01	1.01	1.20	1.20	1.20	5.70	11.50	12.70
MAX	---	---	---	1.01	1.01	1.03	2.40	2.60	1.30	7.00	14.90	18.30
AVG	---	---	---	1.01	1.01	1.02	1.57	1.53	1.28	6.17	13.37	13.81

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.58	1.67	1.53



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

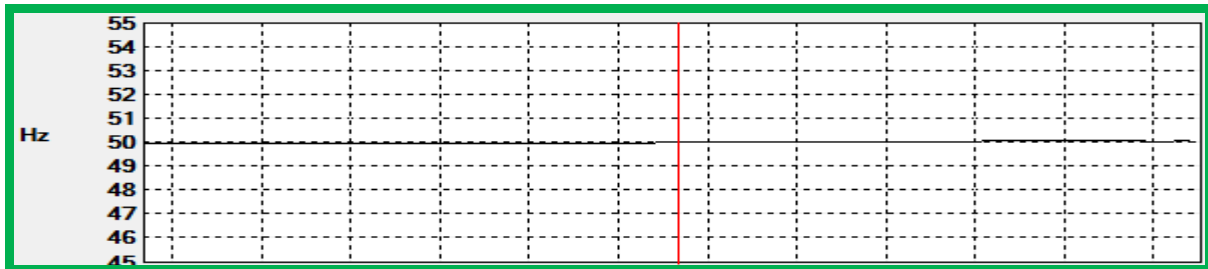


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.44	1.44	1.43	1.66	1.72	1.87
AVG	1.43	1.43	1.43	1.60	1.70	1.59

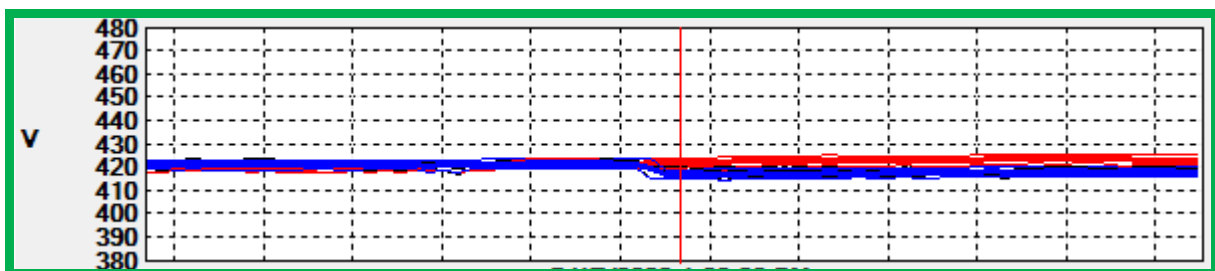


### B11-For-Rani Laxmi Bai Hostel (SS-A)

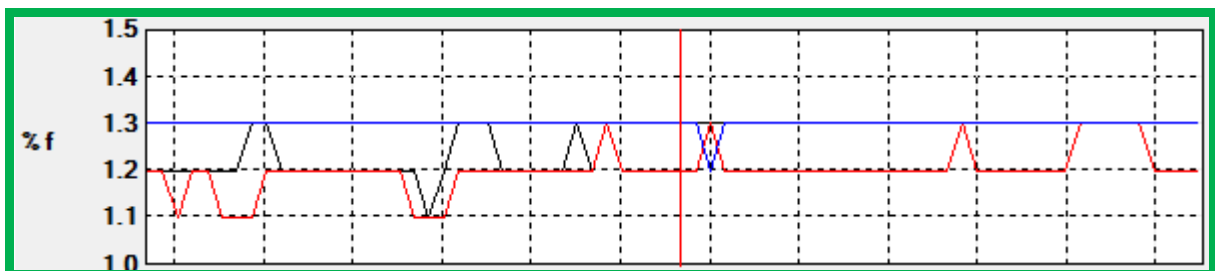
Frequency



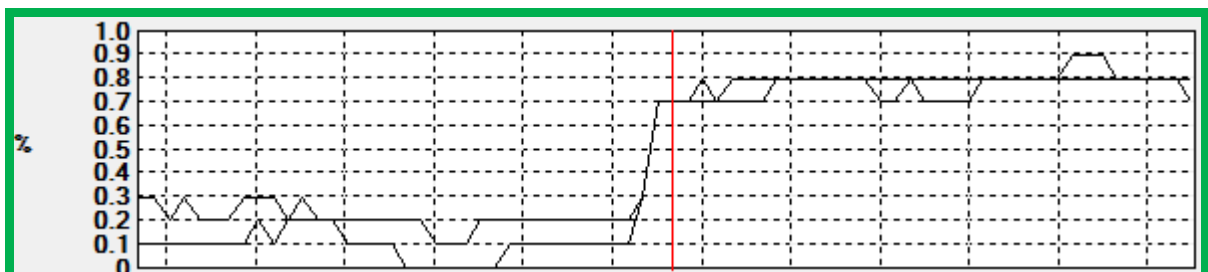
Voltage



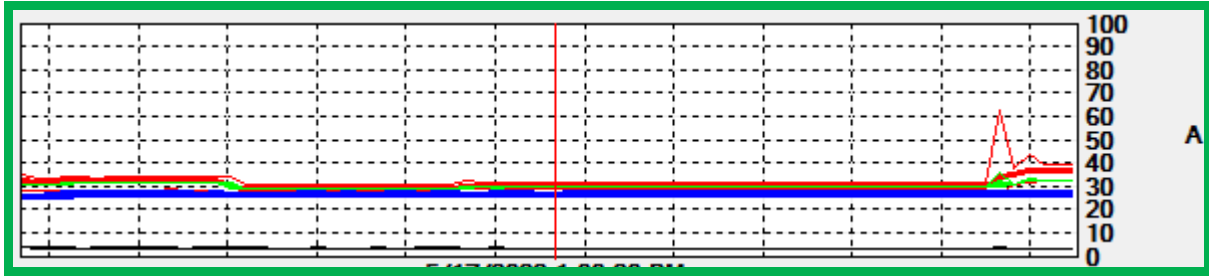
Voltage Harmonics



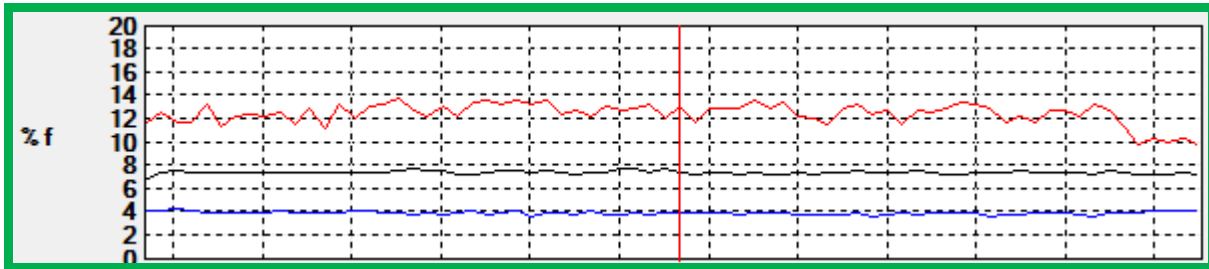
Voltage Un-balance



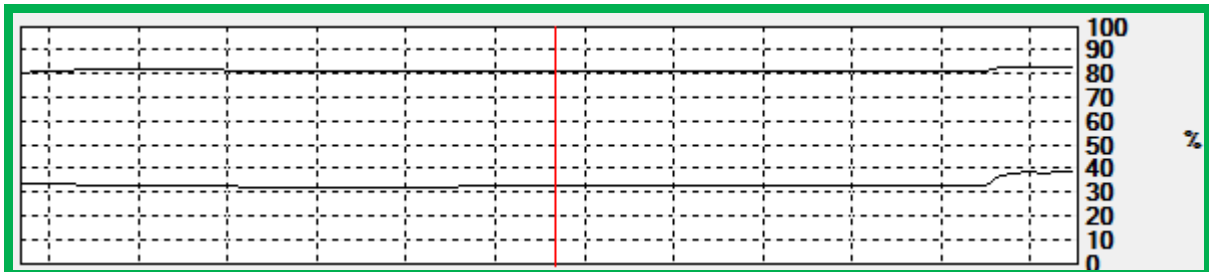
Current



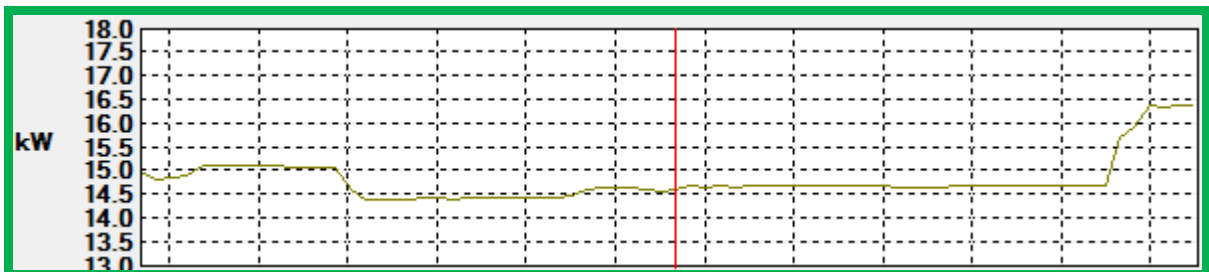
Current Harmonics



Current Un-balance



Power in KW

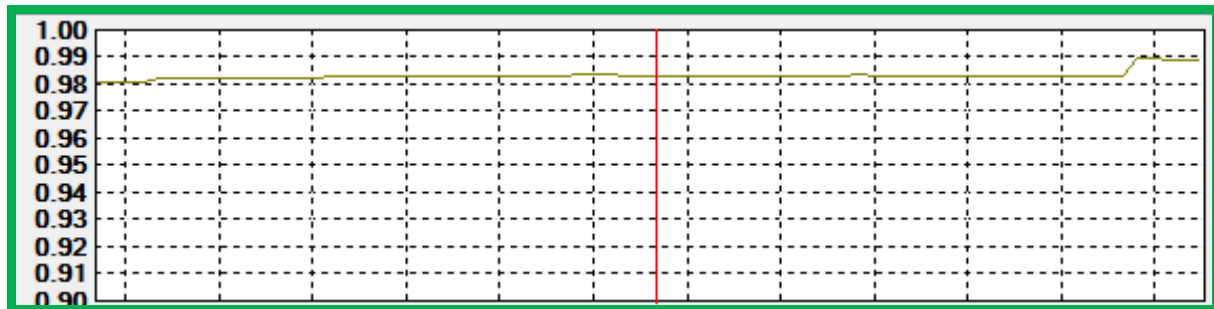


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	417.70	419.80	416.90	3.76	29.63	25.92	0.99	0.97	1.00	49.96	0.00	80.70
MAX	422.20	423.90	421.80	4.03	37.29	27.30	1.00	0.98	1.00	50.07	0.90	83.30
AVG	419.79	422.02	419.46	3.79	31.19	26.97	0.99	0.97	1.00	50.02	0.47	81.61

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.02	1.00	1.00	1.10	1.20	1.20	6.90	9.80	3.70
MAX	---	---	---	1.03	1.01	1.00	1.30	1.30	1.30	7.70	13.80	4.30
AVG	---	---	---	1.03	1.01	1.00	1.20	1.26	1.24	7.45	12.48	3.94

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.52	1.67	1.45



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

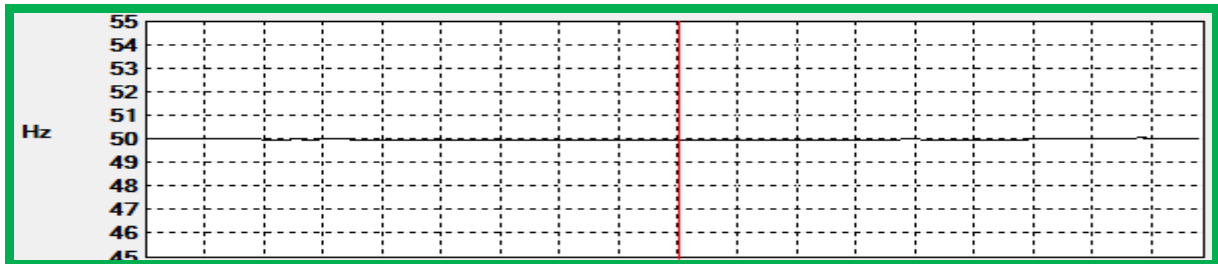


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.43	1.43	1.56	1.84	1.46
AVG	1.43	1.43	1.43	1.54	1.70	1.45

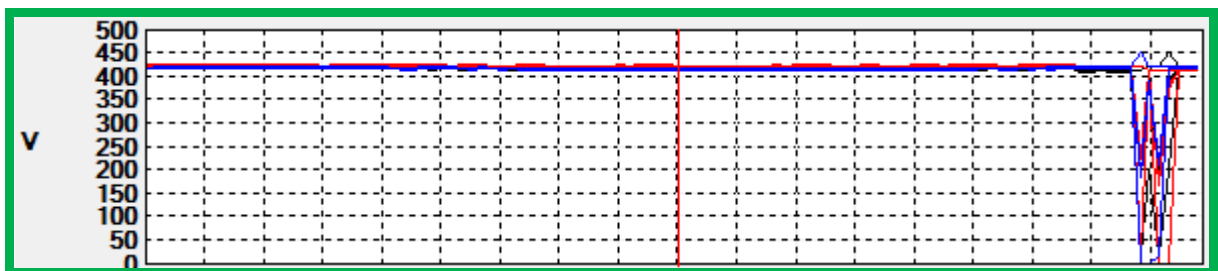


**B12-For-Dara Singh Kushti Hall, MBA (SS-A)**

Frequency



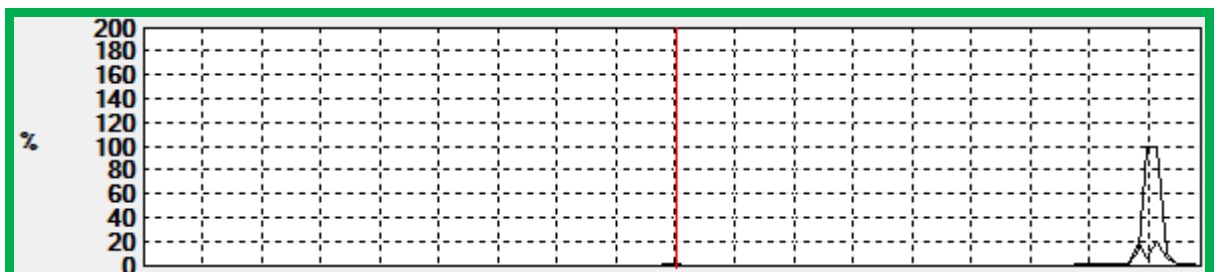
Voltage



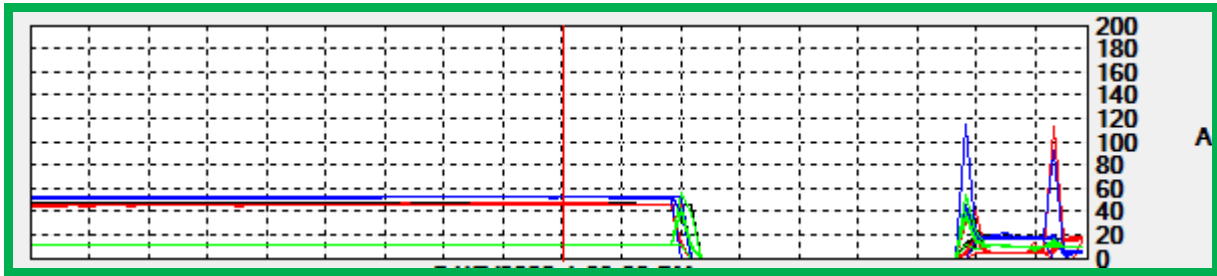
Voltage Harmonics



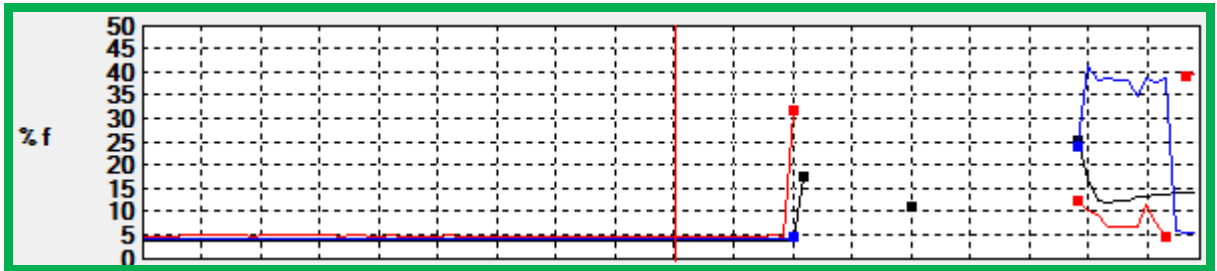
Voltage Un-balance



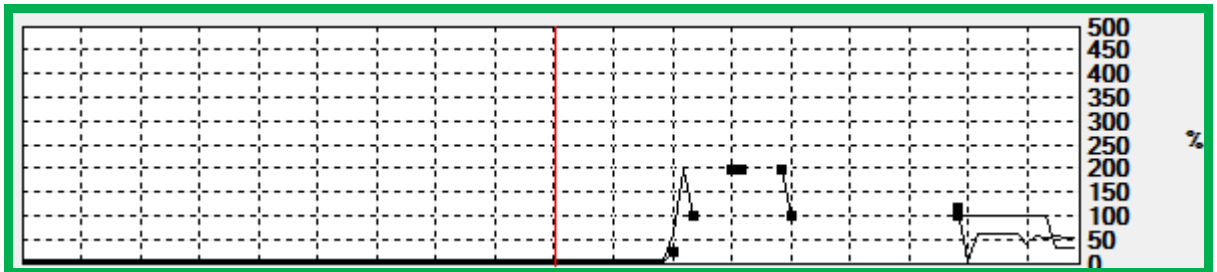
Current



Current Harmonics



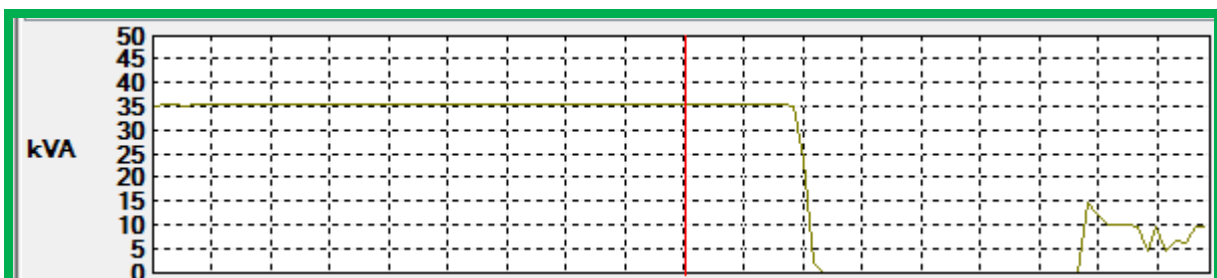
Current Un-balance



Power in KW

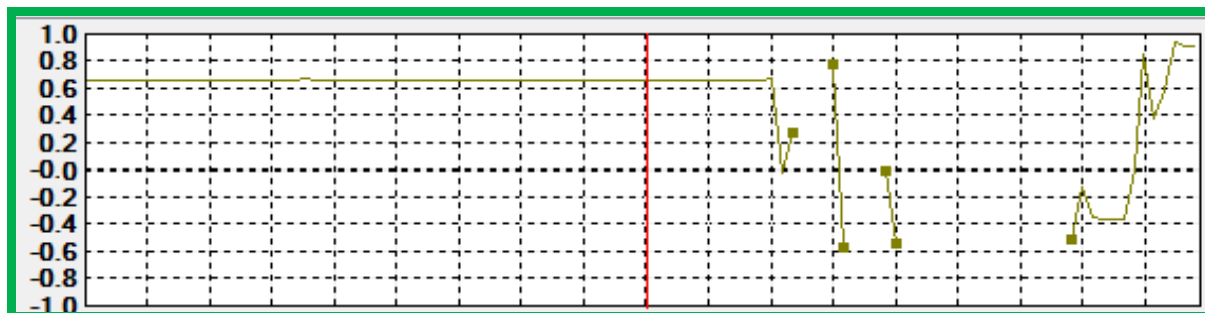


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	416.80	422.00	416.40	46.73	46.06	52.49	0.73	0.63	0.61	49.96	0.60	8.10
MAX	419.60	423.70	419.00	47.45	47.14	53.13	0.74	0.64	0.62	50.03	0.90	8.60
AVG	418.12	422.73	417.98	47.10	46.57	52.83	0.74	0.64	0.62	49.99	0.75	8.18

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	3.84	3.91	4.16	1.00	1.00	1.00	1.20	1.20	1.20	3.70	4.70	4.30
MAX	3.84	3.91	4.16	1.00	1.00	1.00	1.30	1.30	1.40	4.00	5.10	4.50
AVG	3.84	3.91	4.16	1.00	1.00	1.00	1.28	1.29	1.30	3.84	4.90	4.40

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.47	1.48	1.50



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

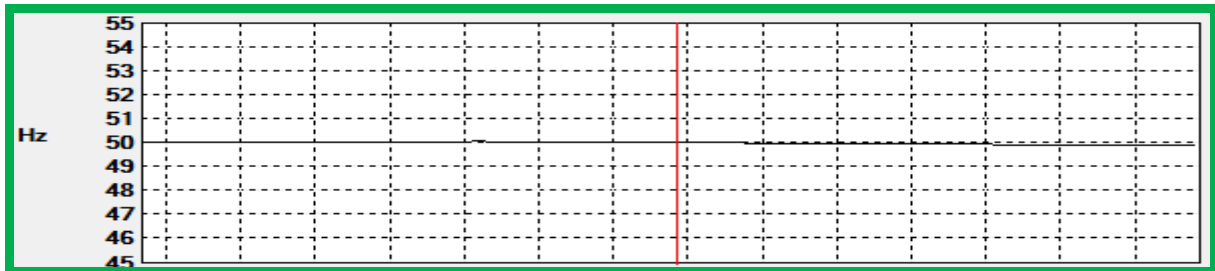


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.43	1.43	1.48	1.50	1.52
AVG	1.43	1.43	1.43	1.47	1.49	1.52

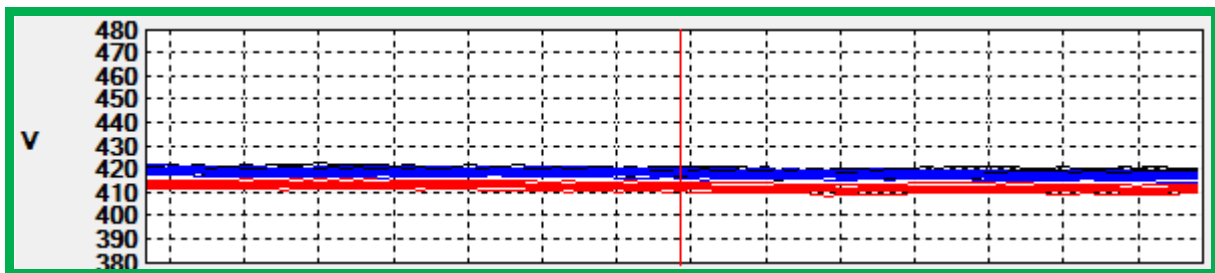


### B13-For-Computer Center and New Answer Book Hall (SS-A)

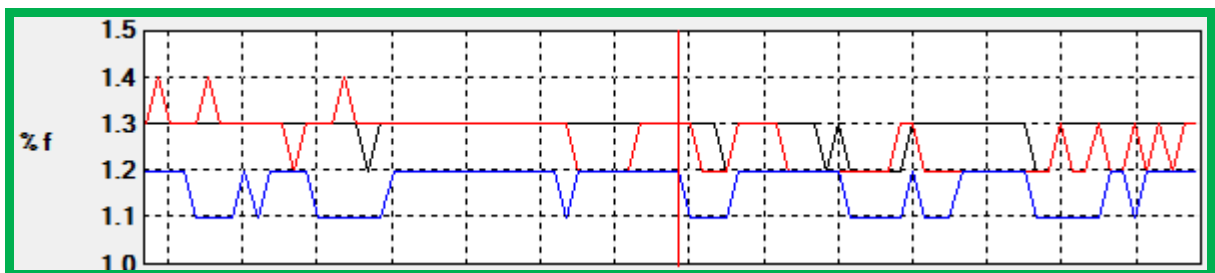
Frequency



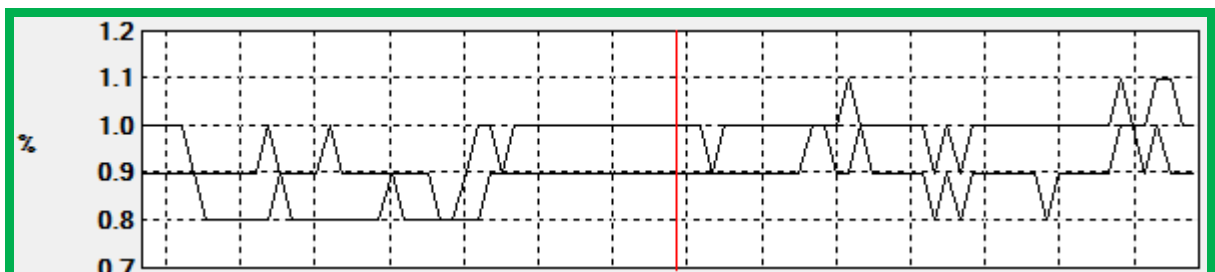
Voltage



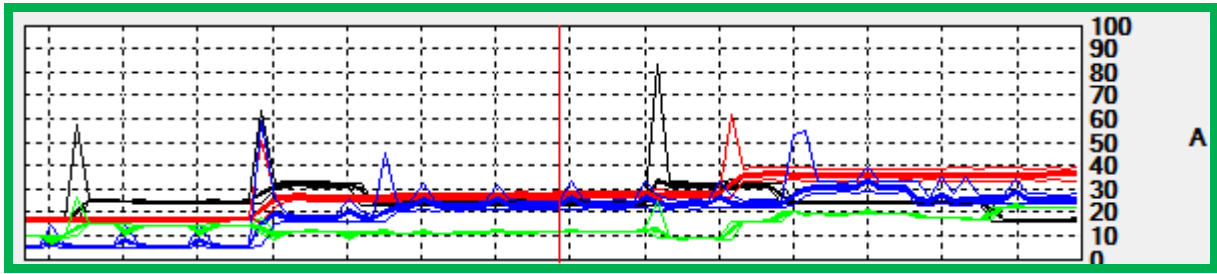
Voltage Harmonics



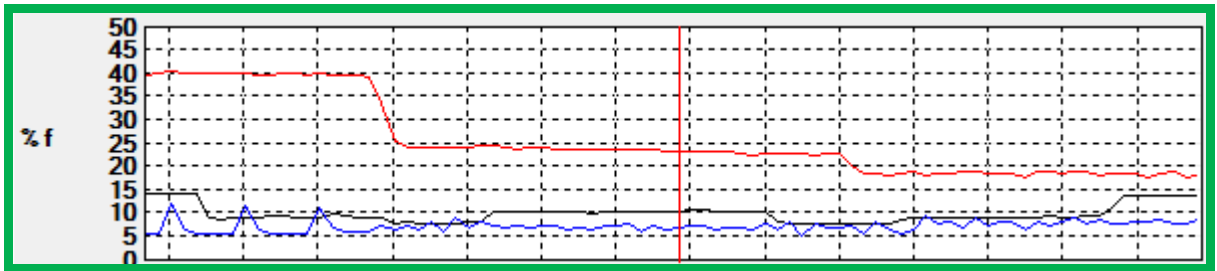
Voltage Un-balance



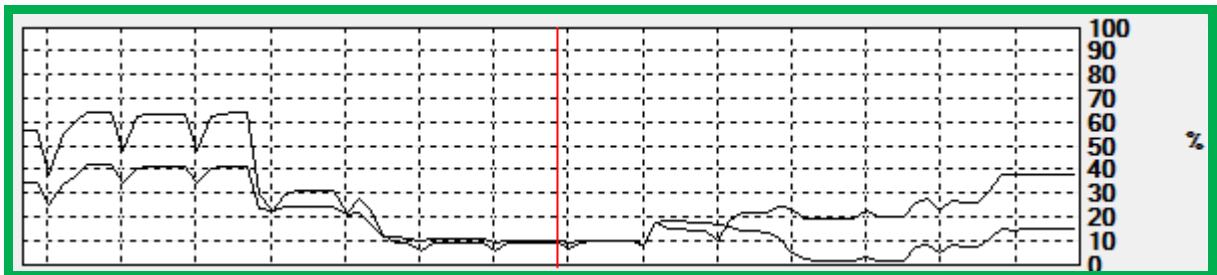
Current



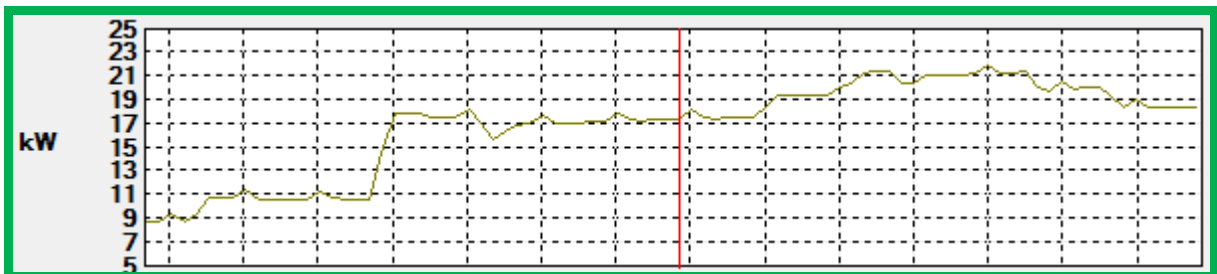
Current Harmonics



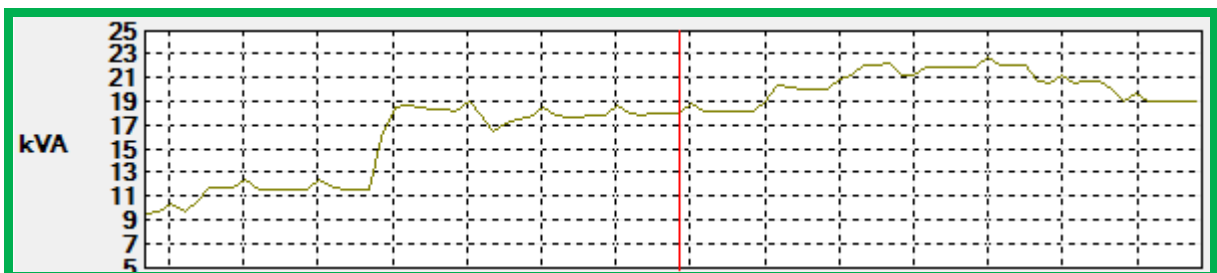
Current Un-balance



Power in KW



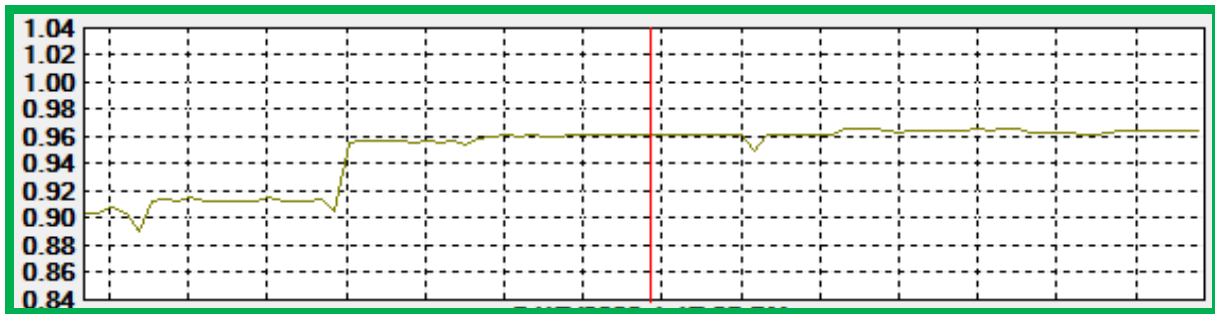
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	418.0	411.1	416.8	16.8	17.4	5.8	0.9	0.8	0.9	49.9	0.9	5.6
MAX	420.6	413.9	420.0	33.3	36.8	34.0	1.0	1.0	1.0	50.1	1.1	64.5
AVG	419.3	412.6	418.3	25.1	28.0	20.4	1.0	0.9	1.0	50.0	1.0	28.7

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	3.7	3.4	3.4	1.0	1.0	1.0	1.2	1.1	1.2	7.6	17.7	5.0
MAX	3.8	3.9	4.2	1.0	1.1	1.0	1.4	1.3	1.3	14.3	40.5	12.0
AVG	3.8	3.6	3.7	1.0	1.0	1.0	1.3	1.2	1.2	9.9	25.7	7.2

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.4	1.4	1.4	1.5	1.8	1.5



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

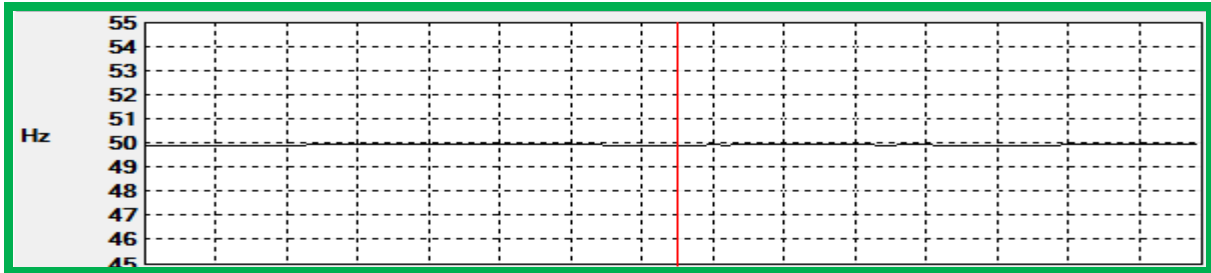


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.4	1.4	1.4	1.8	2.8	2.0
AVG	1.4	1.4	1.4	1.6	1.9	1.6

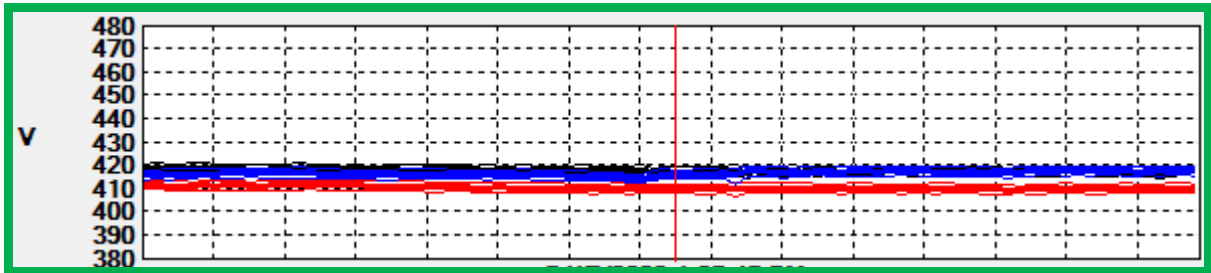


**B14-For-Auditorium, Main Gate and Security Office (SS-A)**

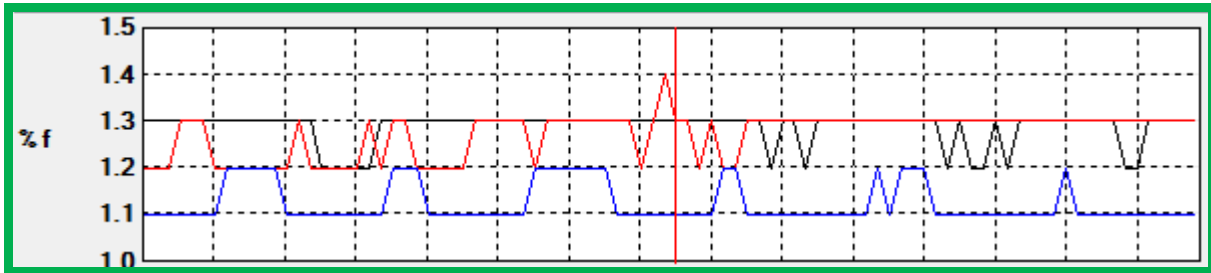
Frequency



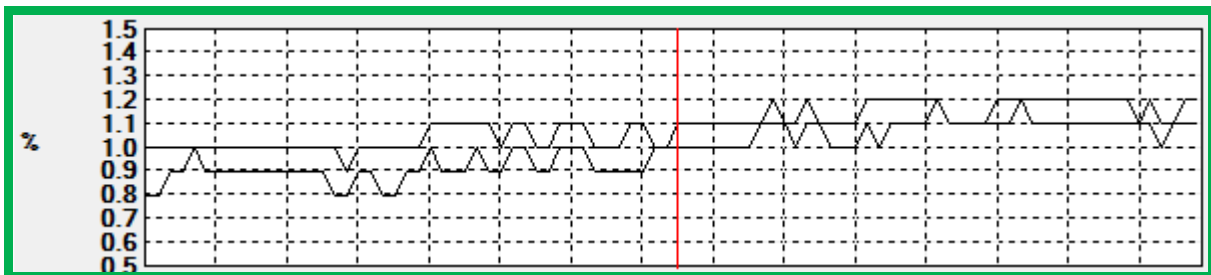
Voltage



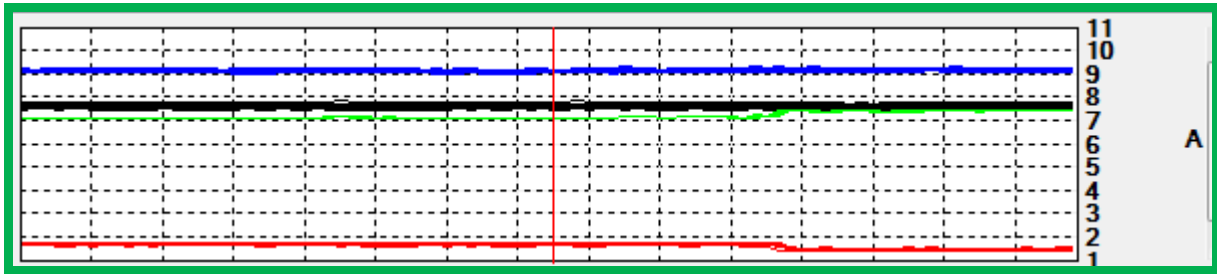
Voltage Harmonics



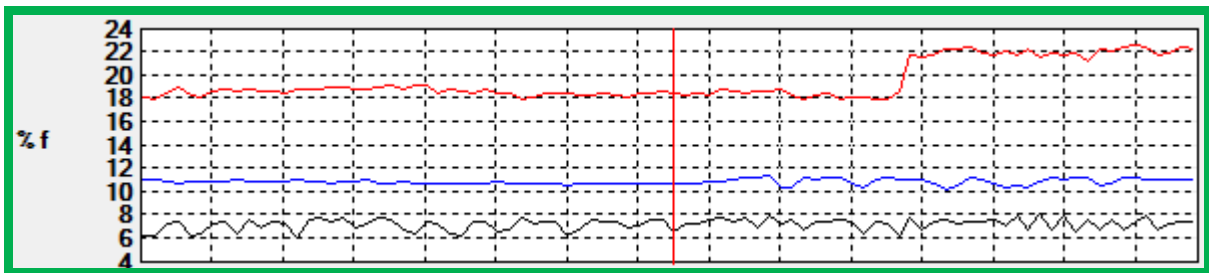
Voltage Un-balance



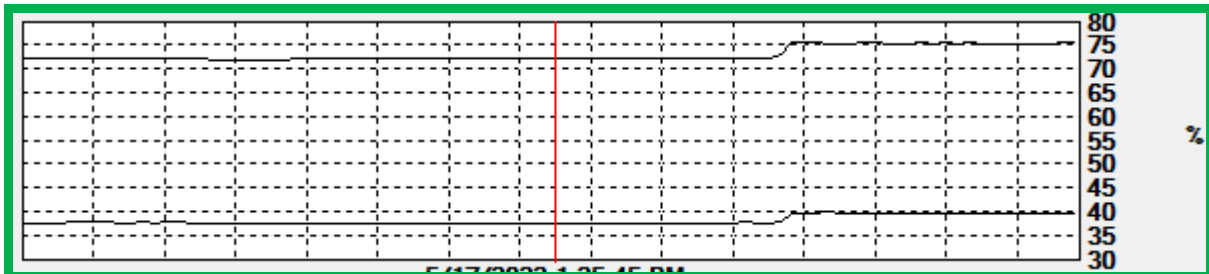
Current



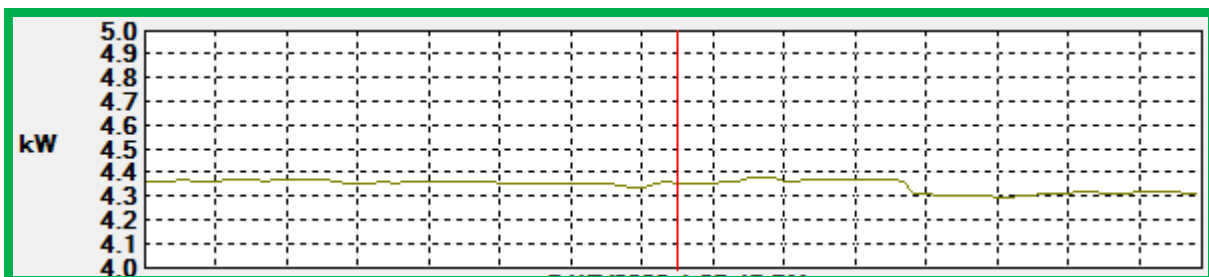
Current Harmonics



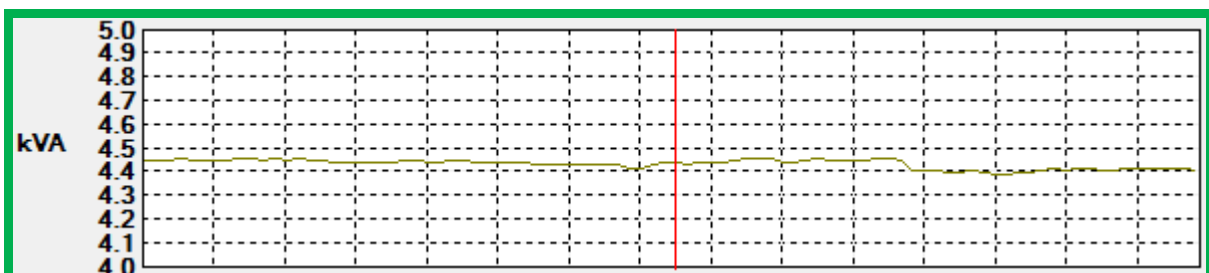
Current Un-balance



Power in KW

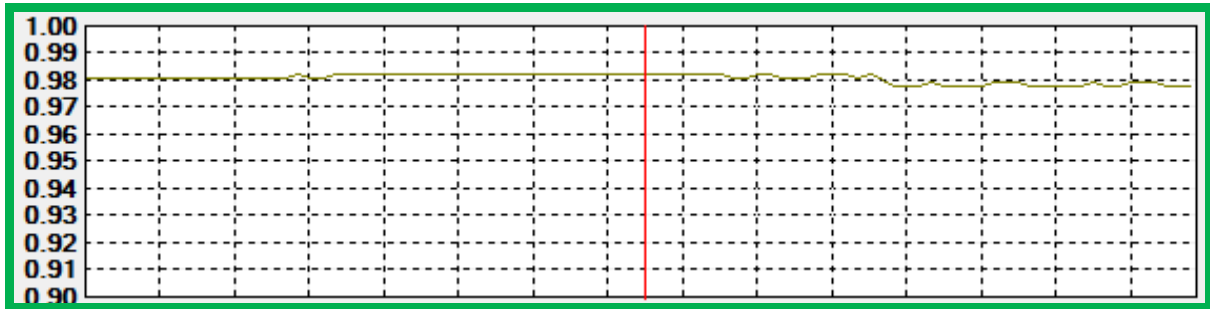


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	416.9	409.7	414.3	7.6	1.5	9.1	1.0	0.8	1.0	49.9	0.9	72.1
MAX	419.0	411.9	417.9	7.7	1.7	9.2	1.0	0.9	1.0	50.0	1.2	75.7
AVG	418.0	410.6	416.8	7.6	1.7	9.2	1.0	0.9	1.0	49.9	1.1	73.2

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.3	0.3	0.3	1.0	1.1	1.0	1.2	1.1	1.2	6.1	17.9	10.2
MAX	3.7	3.4	3.4	1.0	1.1	1.0	1.3	1.2	1.3	8.1	22.6	11.4
AVG	2.6	2.4	2.4	1.0	1.1	1.0	1.3	1.2	1.2	7.2	19.5	10.9

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.4	1.4	1.4	1.5	1.9	1.4



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

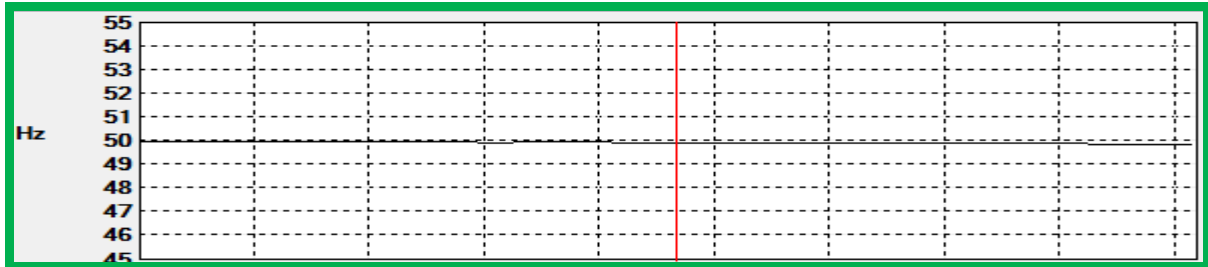


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.4	1.4	1.4	1.5	2.0	1.5
AVG	1.4	1.4	1.4	1.5	1.9	1.4

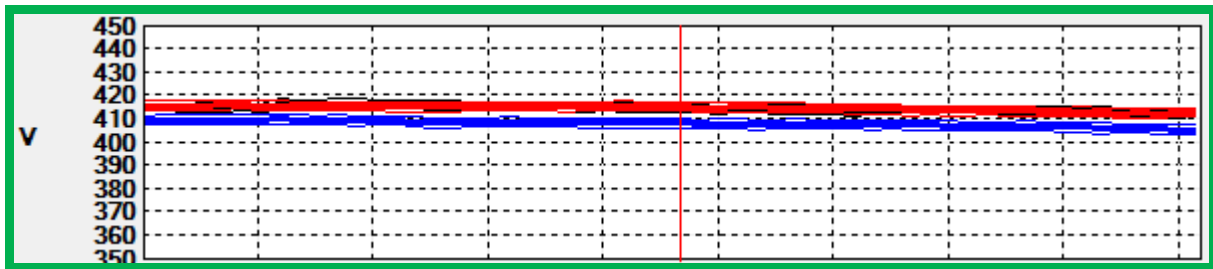


### B15-For-M-Phill (SS-A)

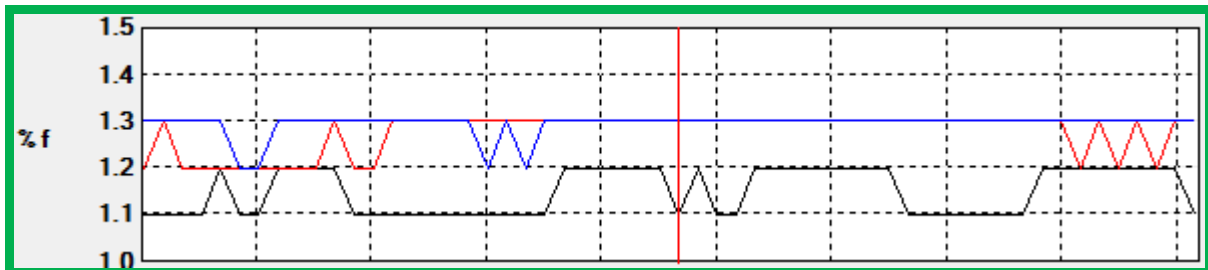
Frequency



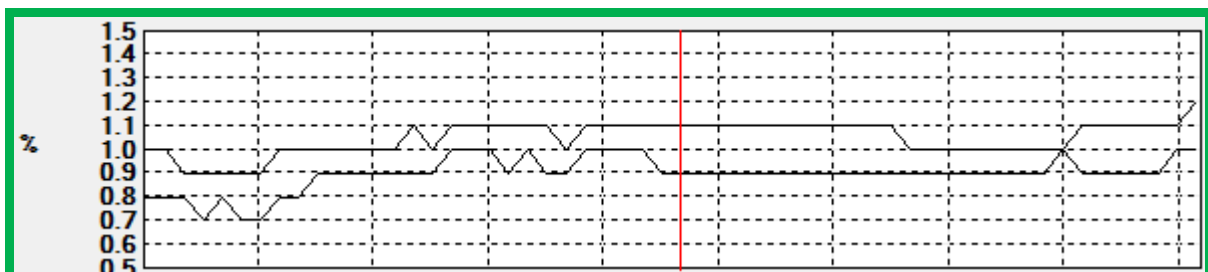
Voltage



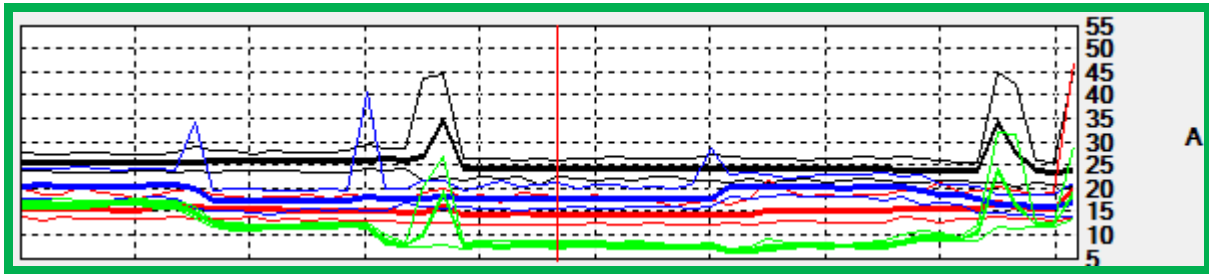
Voltage Harmonics



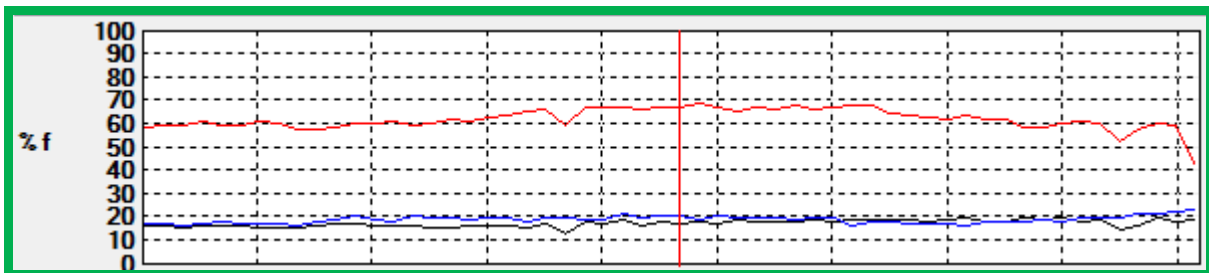
Voltage Un-balance



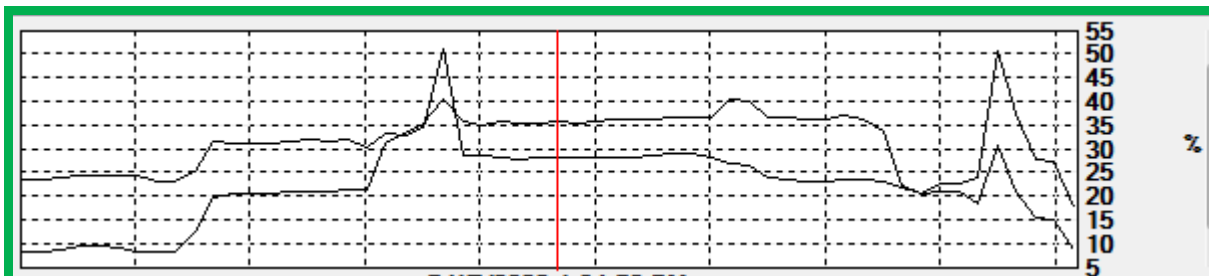
Current



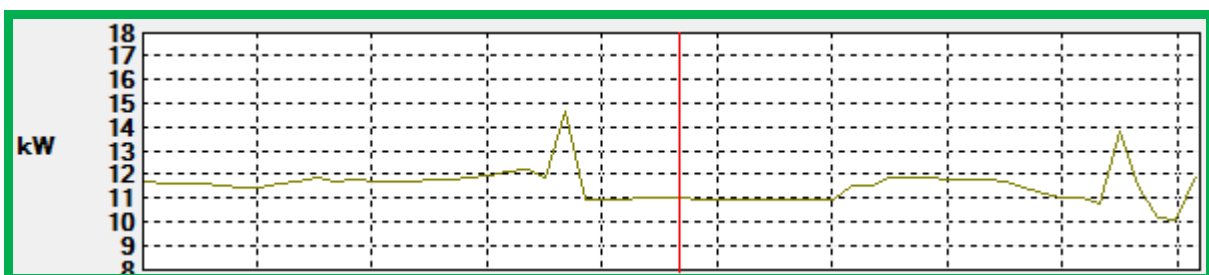
Current Harmonics



Current Un-balance



Power in KW

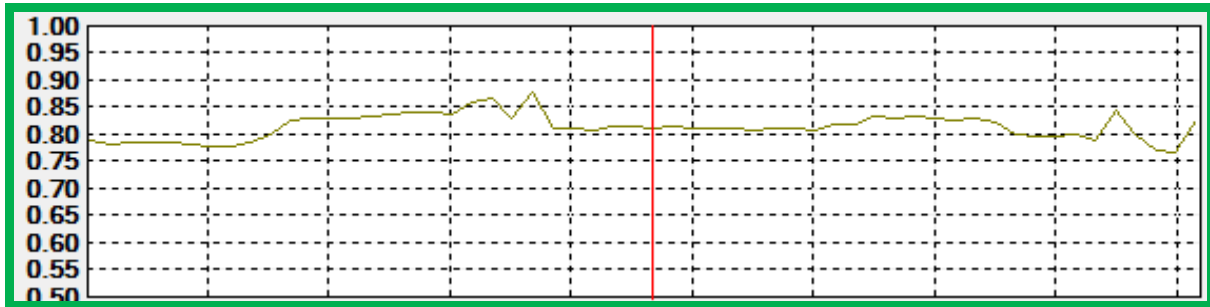


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	412.80	412.40	405.50	23.70	14.37	16.41	0.75	0.69	0.71	49.86	0.90	17.80
MAX	416.80	416.20	410.10	34.91	20.24	20.83	0.90	0.86	0.98	49.98	1.20	51.00
AVG	414.76	414.73	408.13	25.34	15.43	18.77	0.81	0.73	0.89	49.92	1.07	27.99

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.34	0.27	0.30	1.02	1.16	1.07	1.20	1.30	1.20	13.10	42.60	16.20
MAX	5.68	5.11	5.63	1.05	1.32	1.11	1.20	1.40	1.30	20.20	69.30	23.20
AVG	0.53	0.44	0.49	1.04	1.29	1.09	1.20	1.31	1.20	17.43	62.23	19.01

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.65	2.77	1.74



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

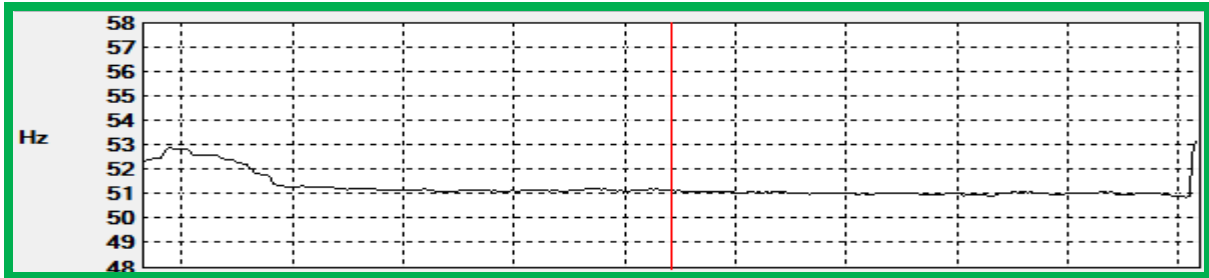


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.43	1.44	2.01	3.12	2.22
AVG	1.43	1.43	1.43	1.74	2.98	2.00

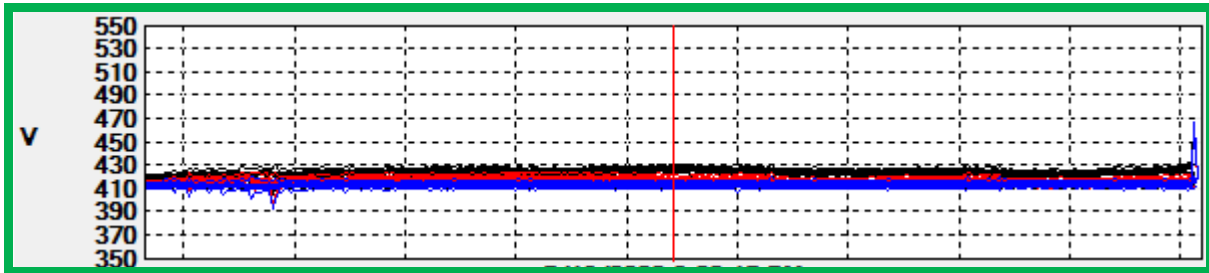


**B47-For-D.G. Set 180 KVA (SS-A)**

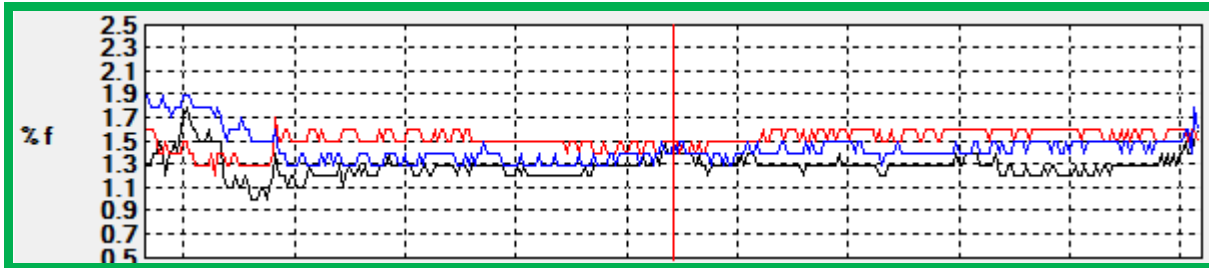
Frequency



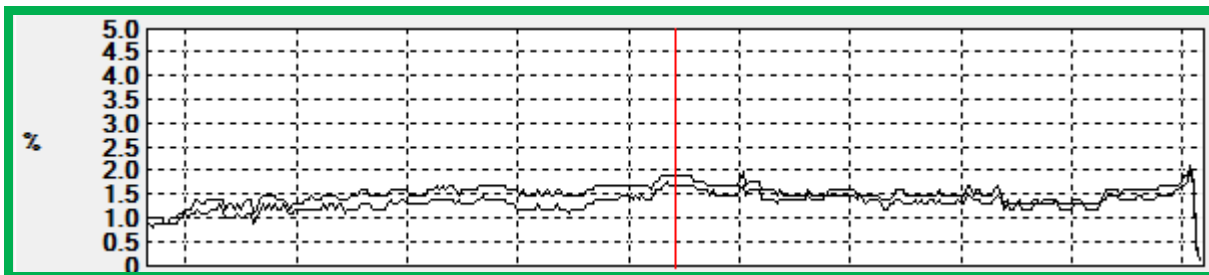
Voltage



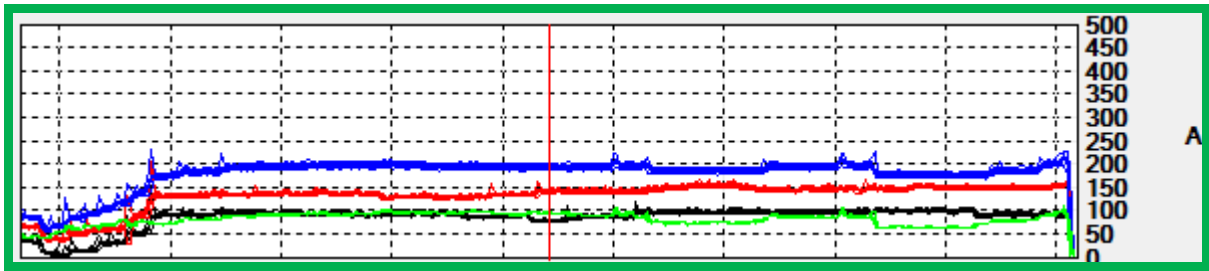
Voltage Harmonics



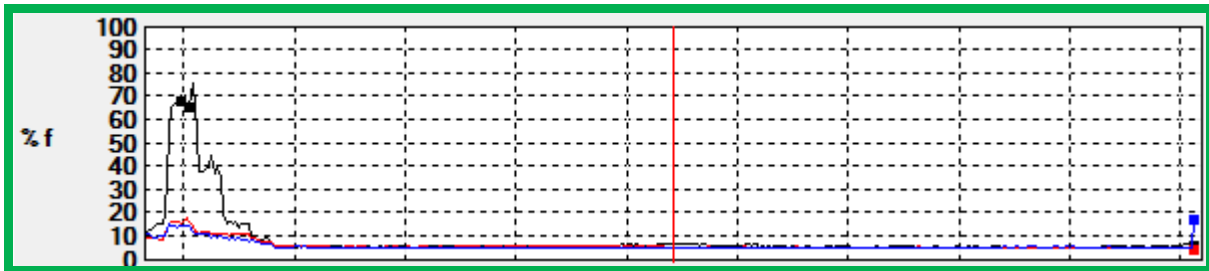
Voltage Un-balance



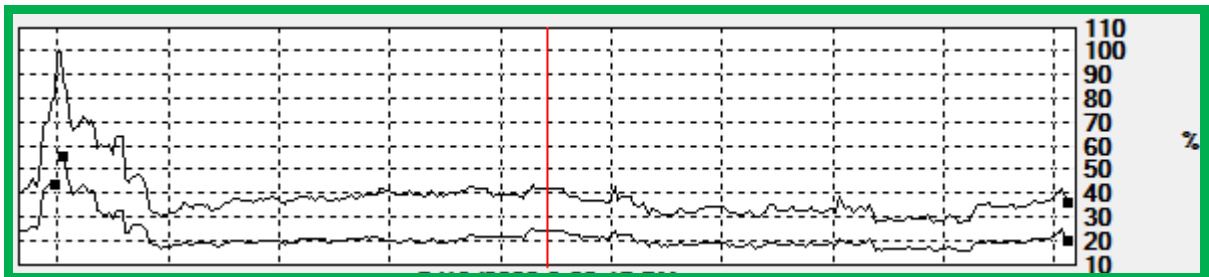
Current



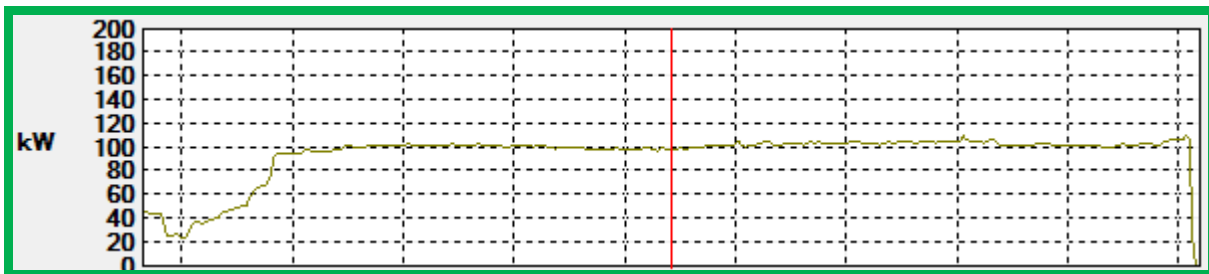
Current Harmonics



Current Un-balance



Power in KW

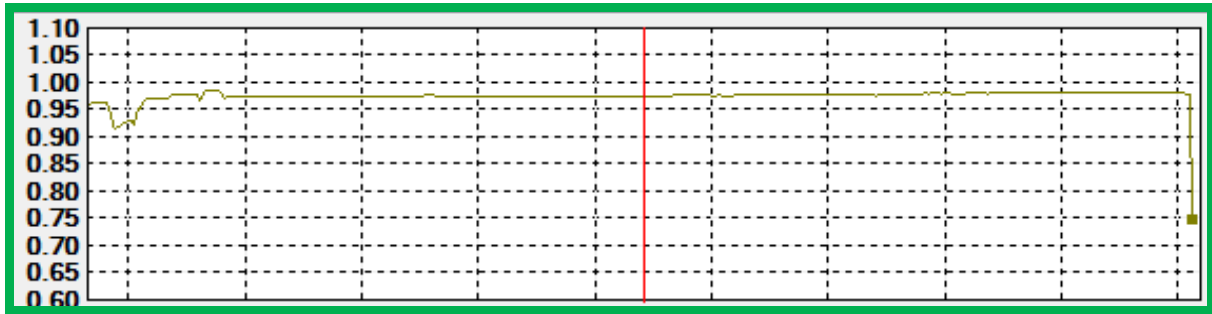


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	419.50	414.10	411.50	4.70	39.20	56.80	0.61	0.76	0.74	50.85	0.40	28.00
MAX	428.70	420.30	418.50	103.60	159.60	217.70	0.99	0.99	0.98	52.88	2.00	88.10
AVG	424.64	417.57	413.64	87.33	133.50	181.18	0.98	0.98	0.97	51.26	1.44	38.54

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.84	0.85	0.83	1.00	1.00	1.00	0.90	1.40	1.10	5.10	4.70	5.10
MAX	0.99	0.87	1.05	1.38	1.02	1.03	1.70	2.30	1.90	76.10	16.60	17.30
AVG	0.98	0.85	1.04	1.01	1.00	1.00	1.35	1.53	1.33	8.52	6.16	5.98

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.39	1.41	1.47	1.51	1.46



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



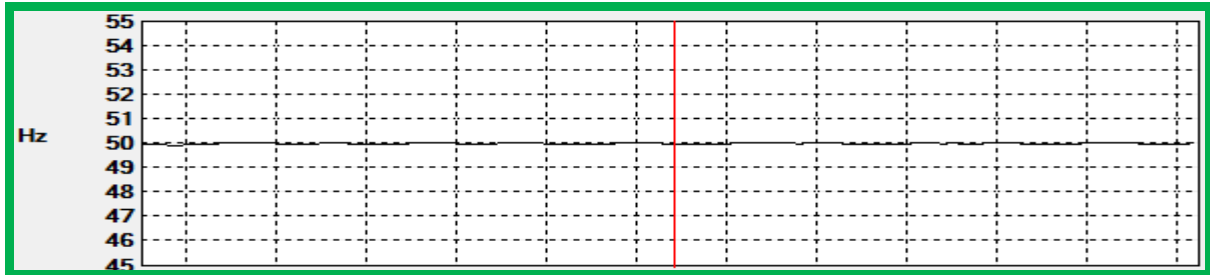
Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.44	1.43	1.42	3.14	2.12	2.06
AVG	1.43	1.42	1.42	1.56	1.57	1.48



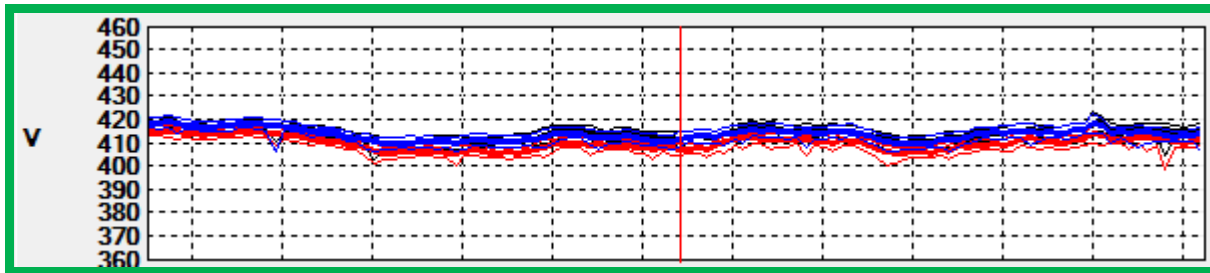
- SUB-STATION B, C AND D AT METER NO. XE498270**

**A5-For-Transformer 630 KVA, Output (SS-B)**

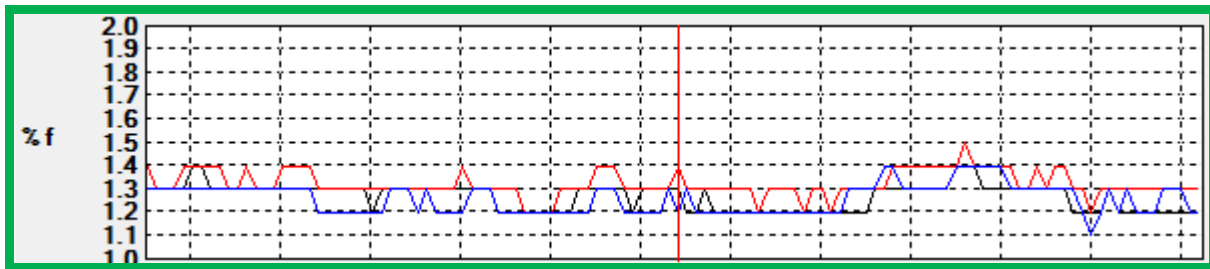
Frequency



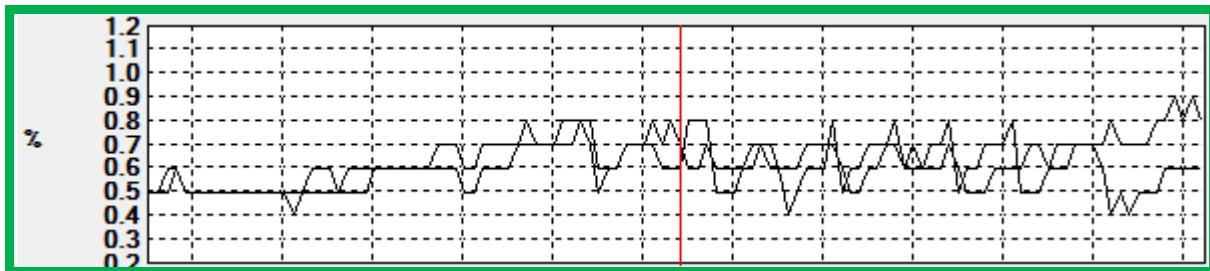
Voltage



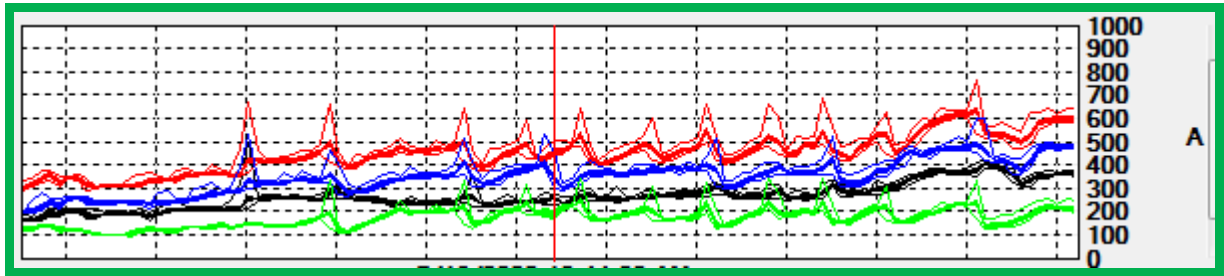
Voltage Harmonics



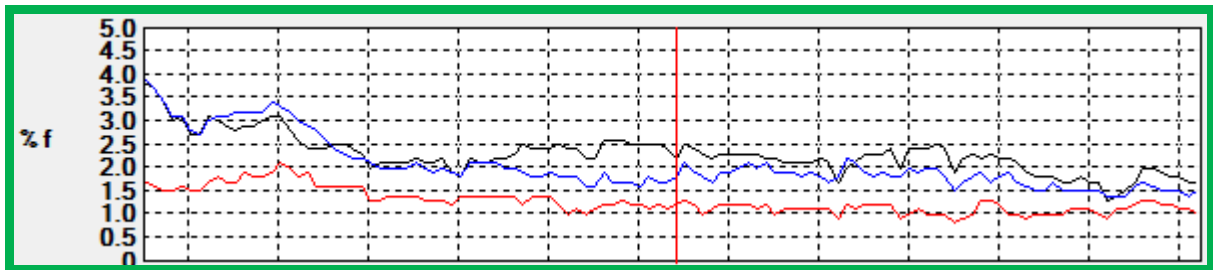
Voltage Un-balance



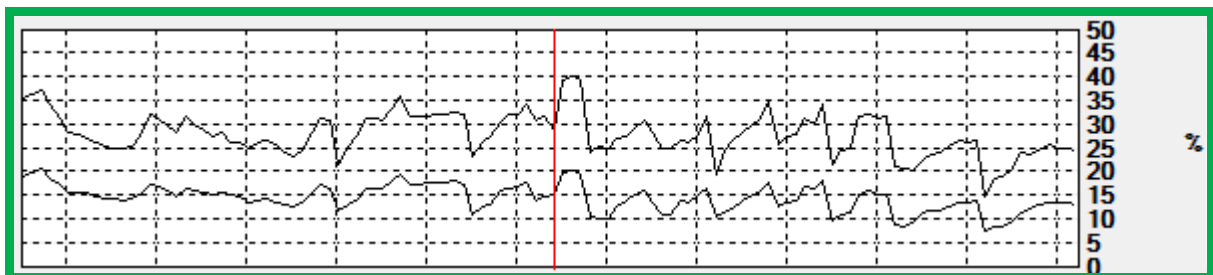
Current



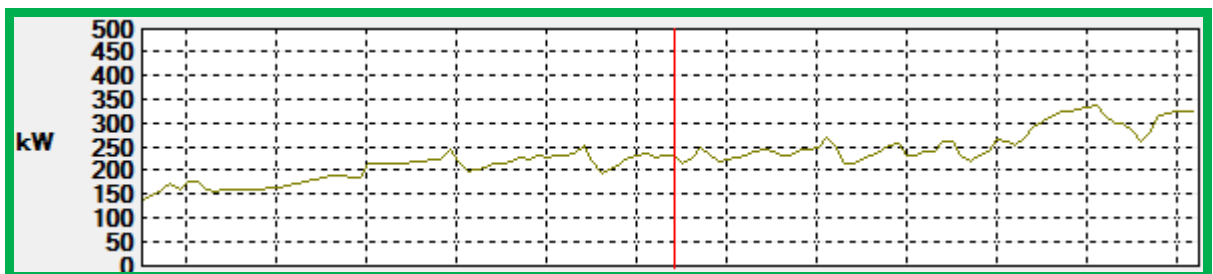
Current Harmonics



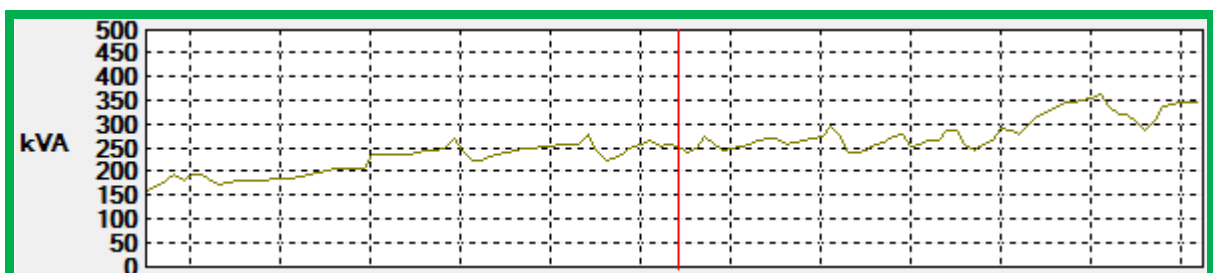
Current Un-balance



Power in KW



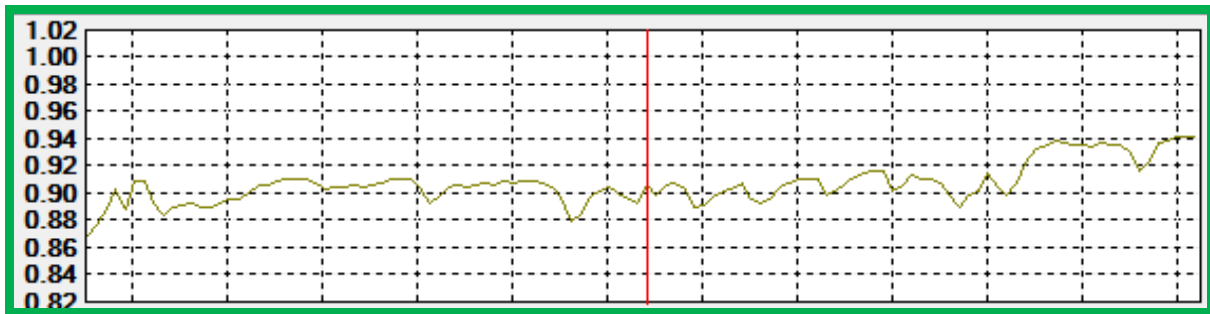
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	409.80	405.40	409.90	165.40	303.60	203.60	0.84	0.88	0.85	49.92	0.40	14.90
MAX	419.20	415.50	419.20	409.90	637.20	489.20	0.94	0.94	0.95	50.06	0.90	40.20
AVG	414.16	410.07	413.91	267.74	452.14	350.39	0.89	0.91	0.91	50.00	0.64	28.10

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.21	0.22	0.23	1.00	1.00	1.00	1.20	1.20	1.10	1.30	0.80	1.40
MAX	0.49	0.57	0.52	1.00	1.00	1.00	1.40	1.40	1.40	3.80	2.10	3.90
AVG	0.31	0.30	0.34	1.00	1.00	1.00	1.28	1.28	1.28	2.29	1.28	2.06

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.42	1.43	1.42



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

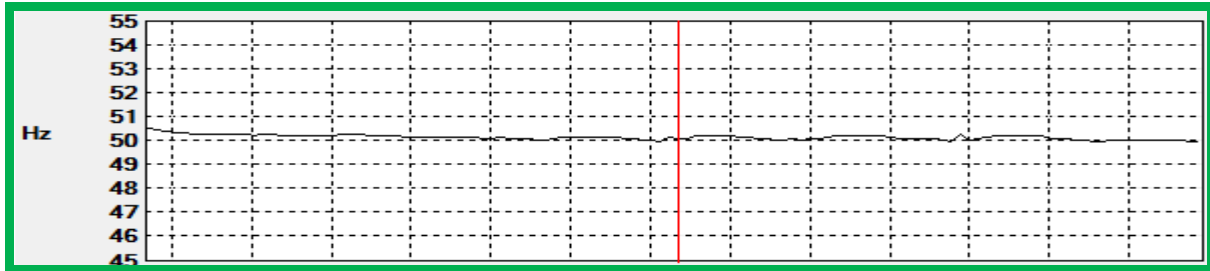


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.44	1.44	1.44	1.46	1.46	1.44
AVG	1.44	1.43	1.44	1.44	1.44	1.43

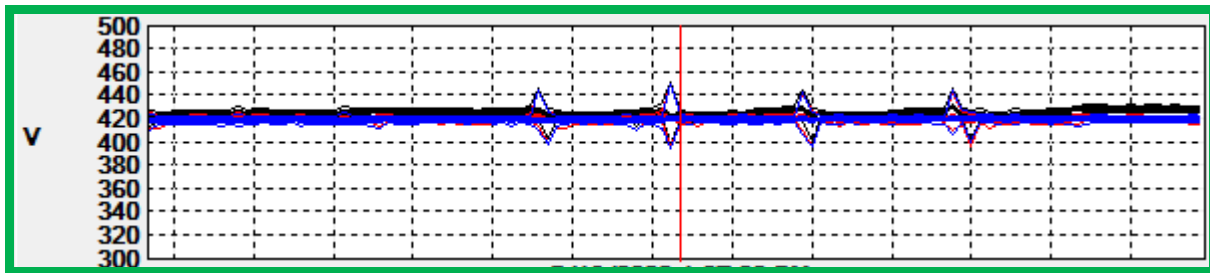


**A6-For-D.G. Set 380 KVA, (SS-B)**

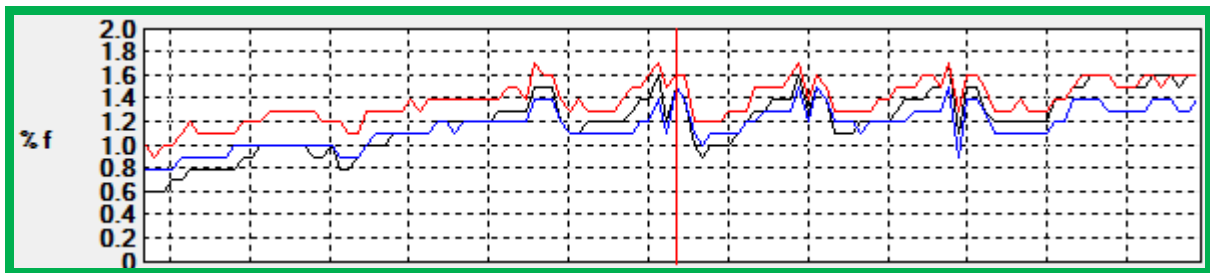
Frequency



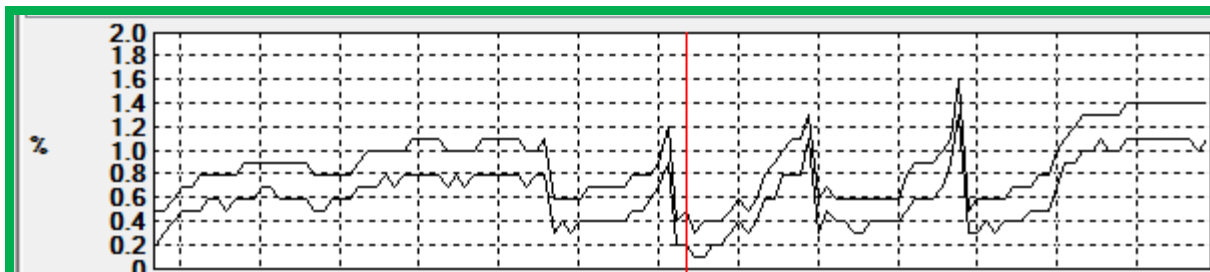
Voltage



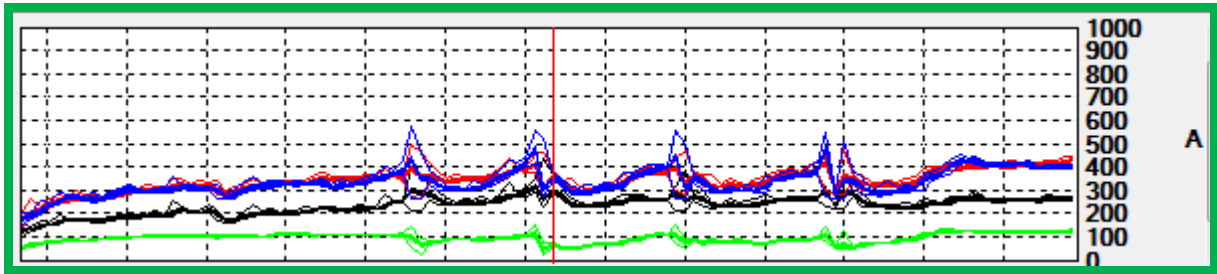
Voltage Harmonics



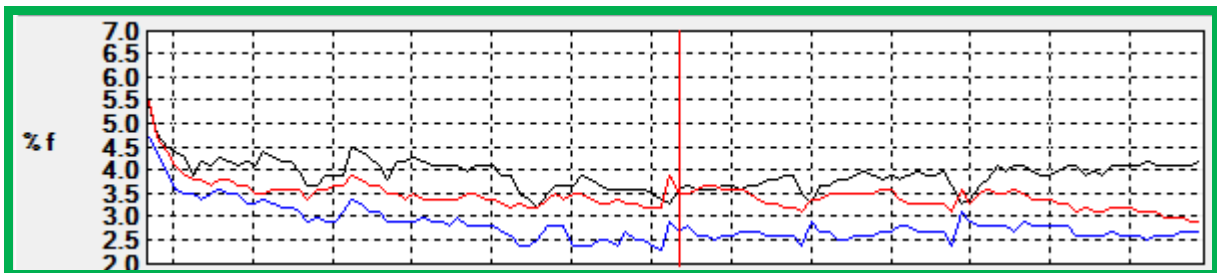
Voltage Un-balance



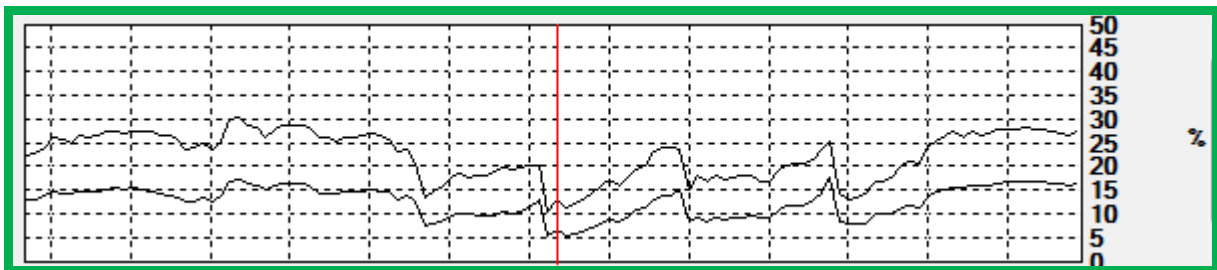
Current



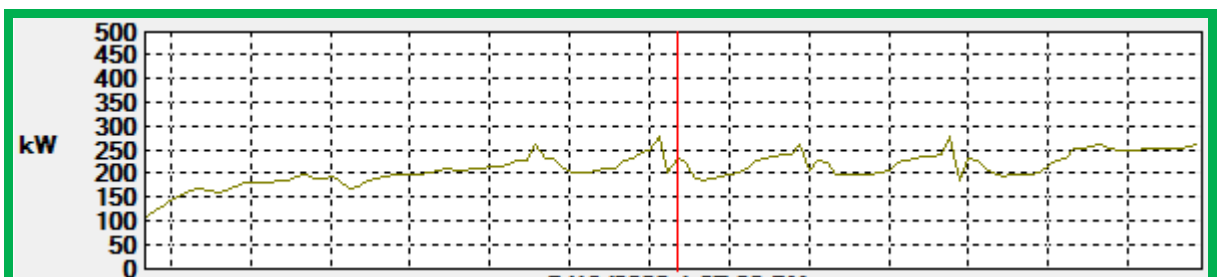
Current Harmonics



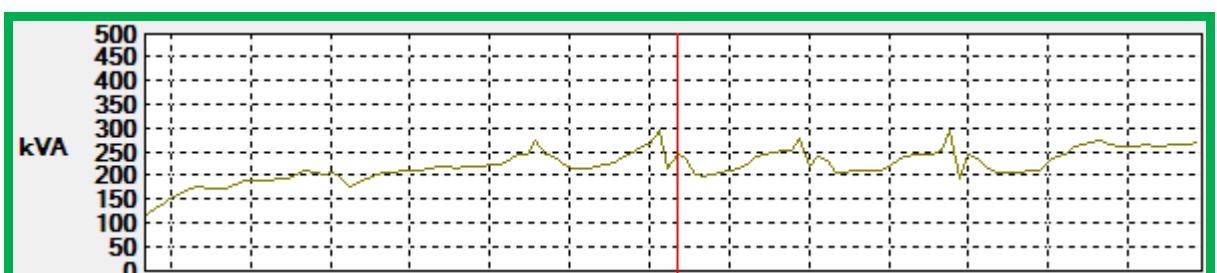
Current Un-balance



Power in KW

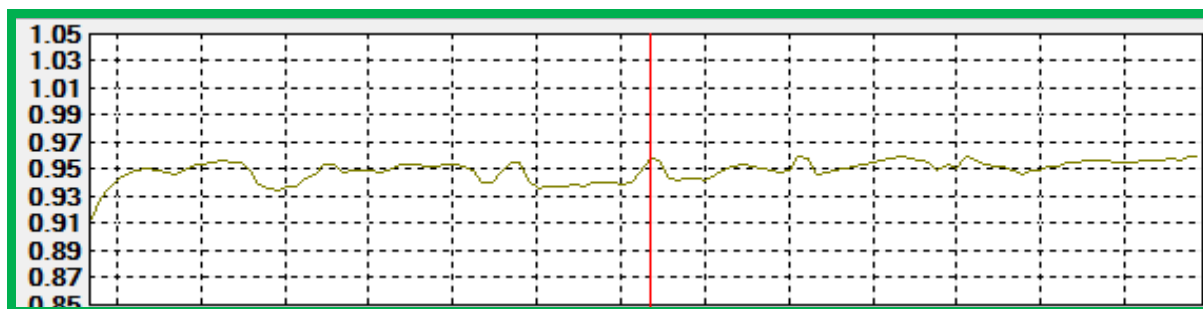


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	422.40	417.70	418.80	127.60	182.30	184.00	0.86	0.94	0.93	49.95	0.40	10.80
MAX	431.30	422.30	420.30	320.50	437.80	484.80	0.95	0.98	0.96	50.53	1.60	30.60
AVG	425.48	419.79	419.63	236.87	342.92	336.76	0.93	0.96	0.95	50.15	0.92	22.50

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.87	0.90	1.05	1.00	1.00	1.00	0.70	1.00	0.60	3.20	2.90	2.30
MAX	1.50	1.74	1.74	1.00	1.00	1.00	1.70	1.60	1.60	5.40	5.50	4.70
AVG	1.32	1.51	1.45	1.00	1.00	1.00	1.34	1.33	1.10	3.93	3.47	2.84

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.42	1.41	1.44	1.44	1.44



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

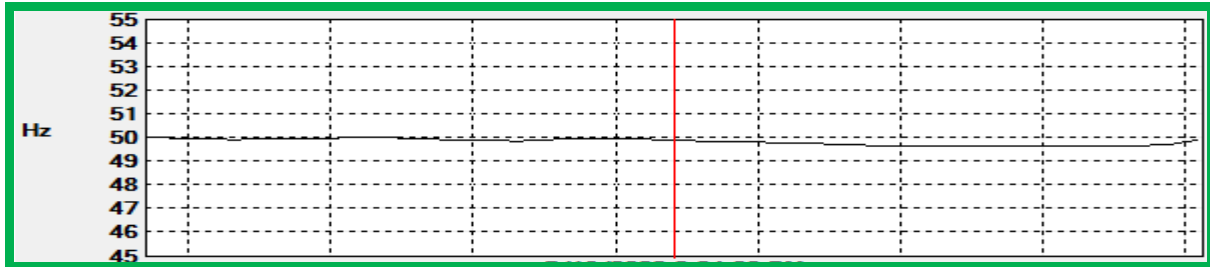


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.43	1.43	1.43	1.53	1.53	1.51
AVG	1.42	1.43	1.42	1.47	1.47	1.47

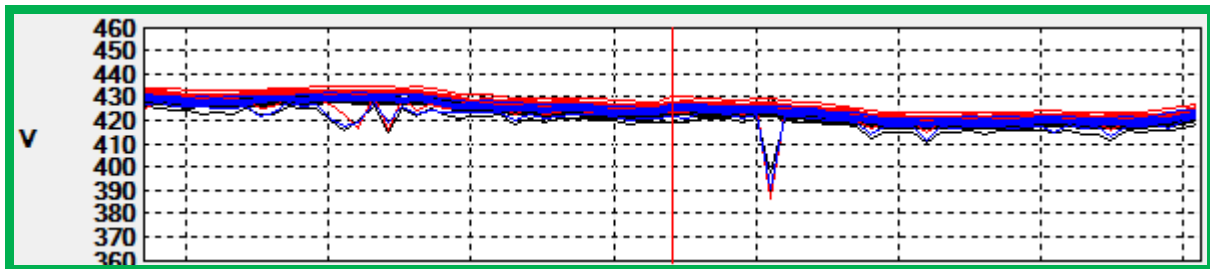


**A7-For-Transformer 630 KVA, Kendriya Mulyankan Bhawan (SS-B)**

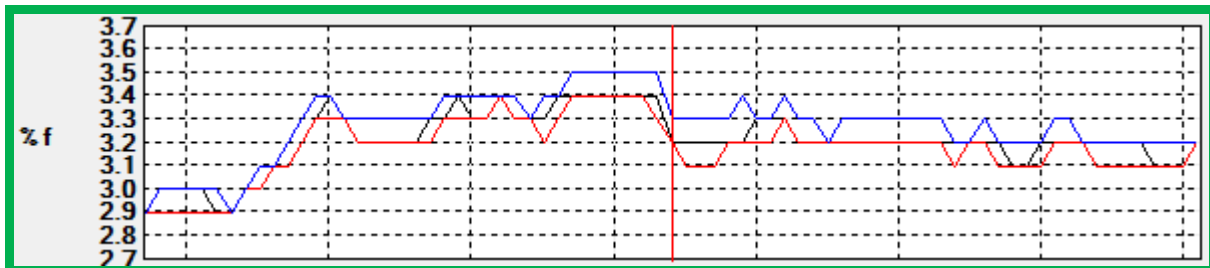
Frequency



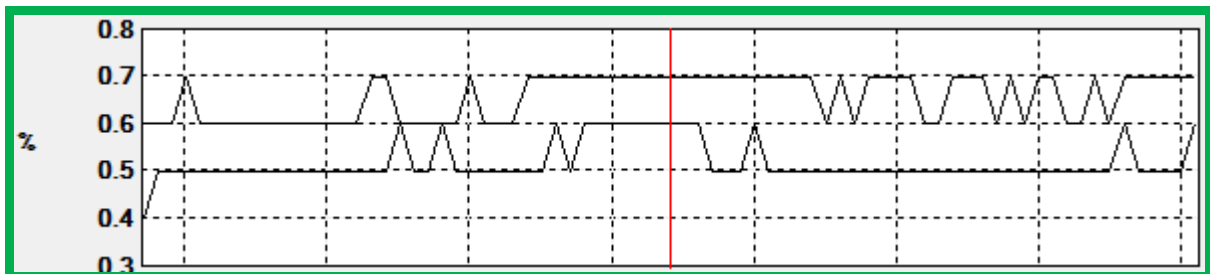
Voltage



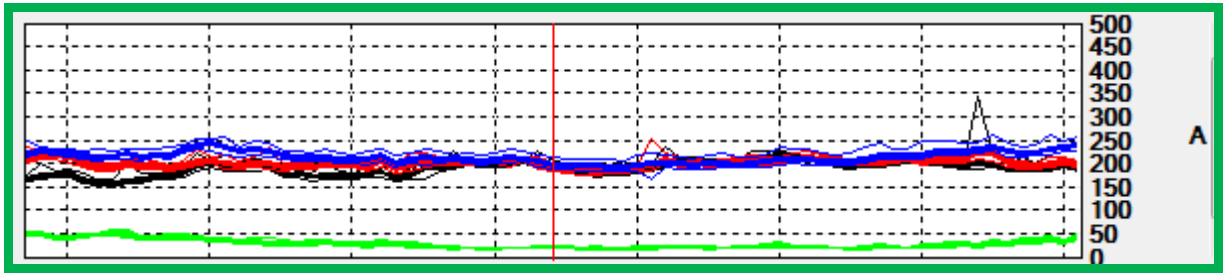
Voltage Harmonics



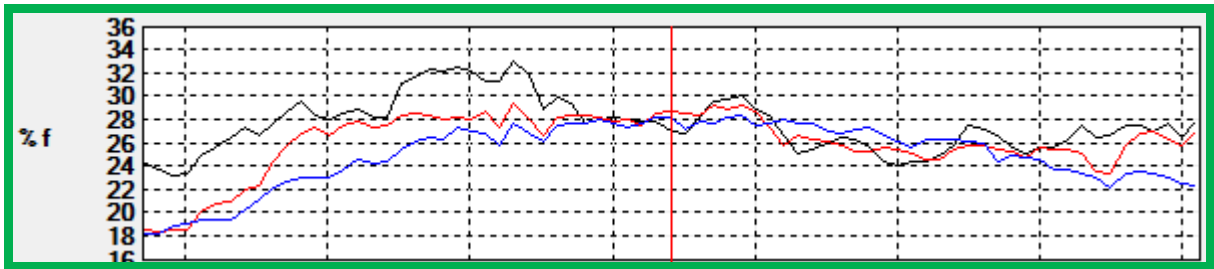
Voltage Un-balance



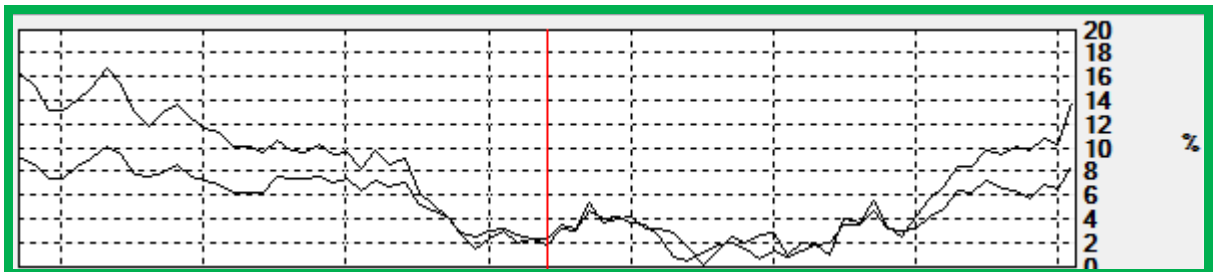
Current



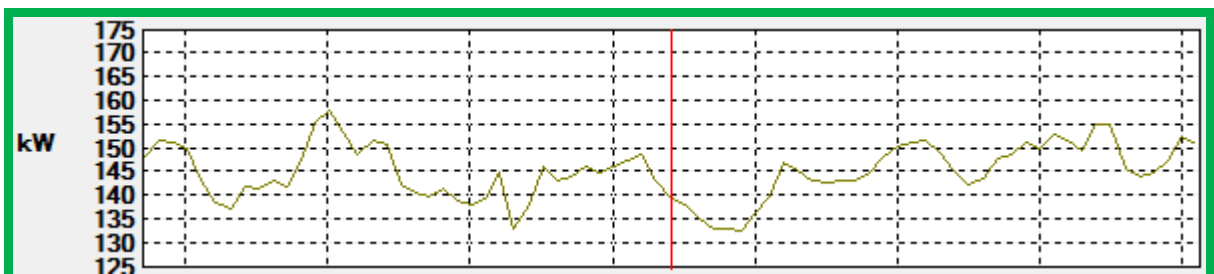
Current Harmonics



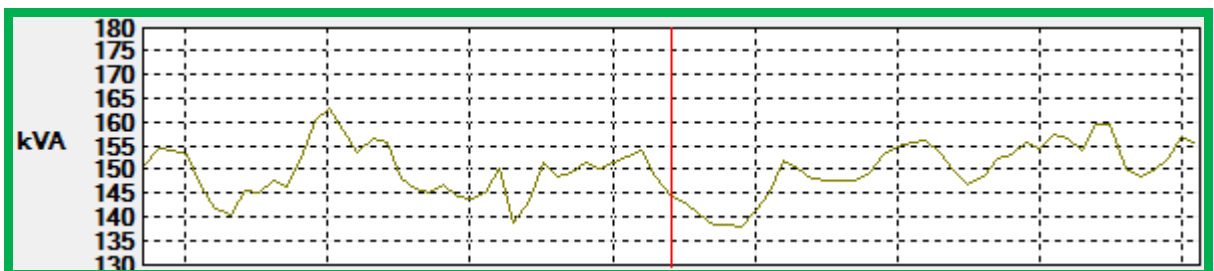
Current Un-balance



Power in KW



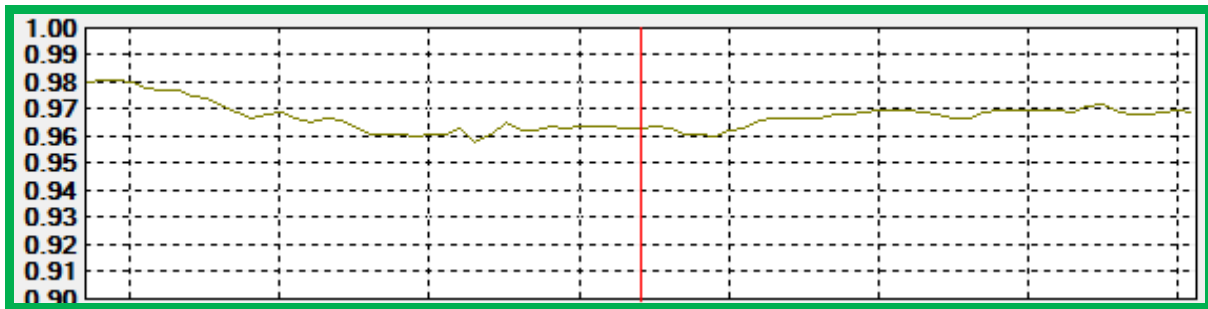
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	417.40	421.20	419.00	157.70	184.30	195.10	0.95	0.96	0.96	49.63	0.50	0.20
MAX	428.60	432.80	430.10	219.20	224.10	243.90	0.97	0.98	0.98	50.03	0.60	16.70
AVG	422.76	426.87	424.38	192.08	203.23	216.14	0.96	0.97	0.97	49.84	0.51	7.26

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.29	0.29	0.28	1.08	1.06	1.05	2.90	2.90	2.90	23.30	18.50	18.30
MAX	0.60	0.70	0.90	1.13	1.11	1.10	3.40	3.50	3.50	33.00	29.40	28.40
AVG	0.47	0.53	0.54	1.10	1.09	1.08	3.17	3.20	3.26	27.64	26.06	25.03

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.46	1.45	1.46	1.65	1.60	1.62



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

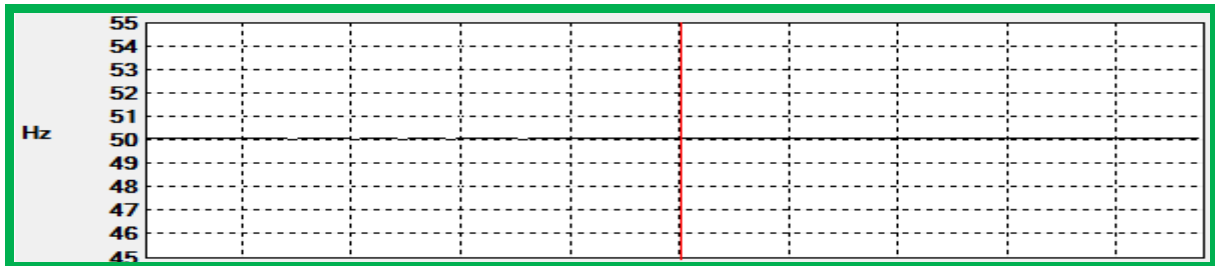


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.47	1.47	1.48	1.80	1.76	1.80
AVG	1.47	1.47	1.47	1.75	1.71	1.74

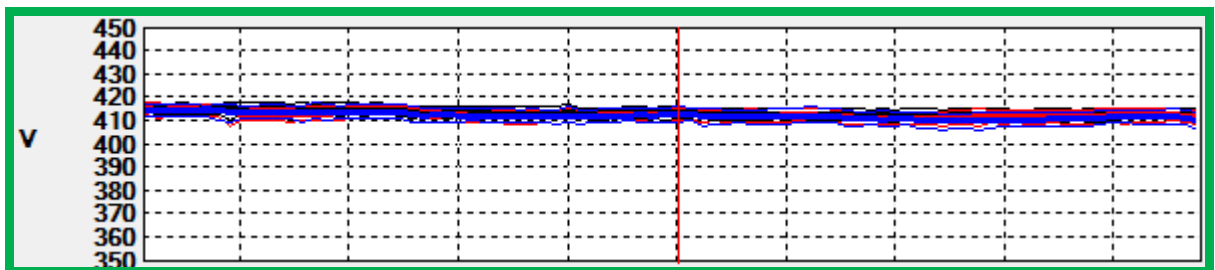


**A8-For-D.G. set 400 KVA, Kendriya Mulyankan Bhawan (SS-B)**

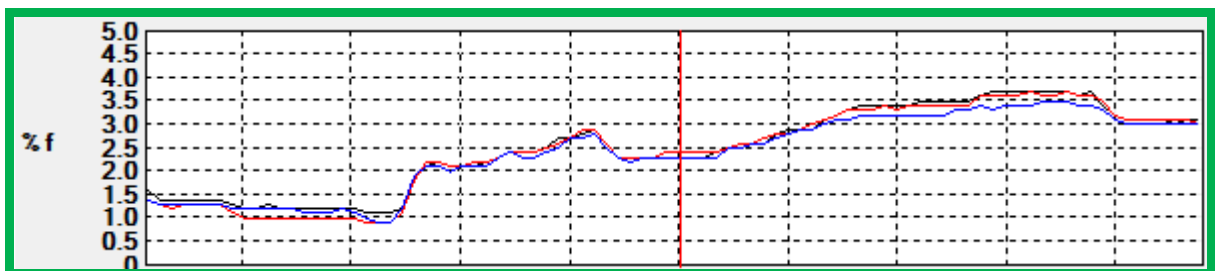
Frequency



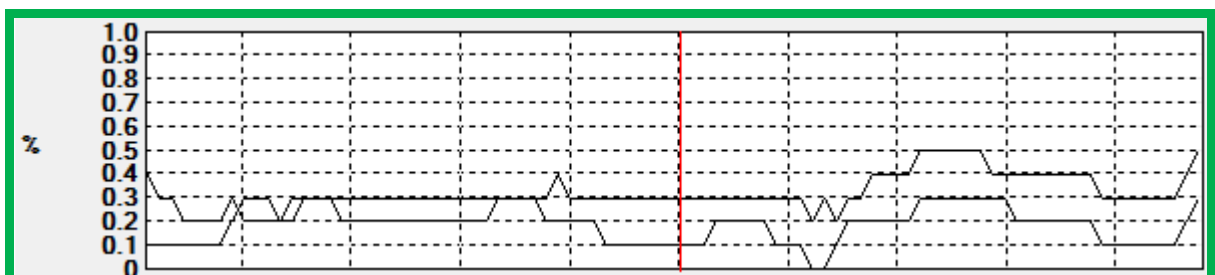
Voltage



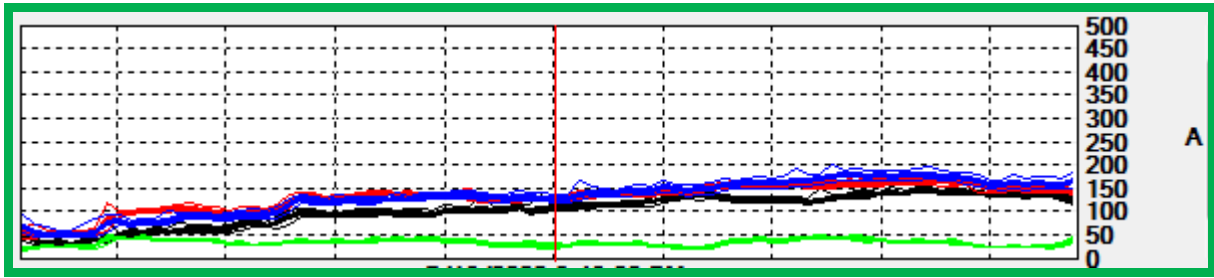
Voltage Harmonics



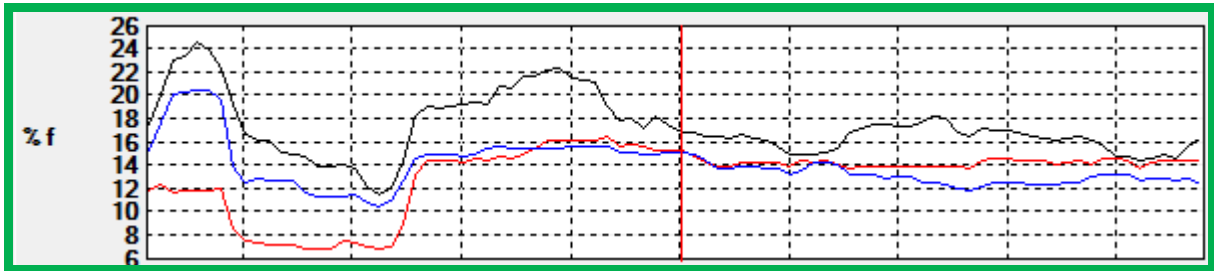
Voltage Un-balance



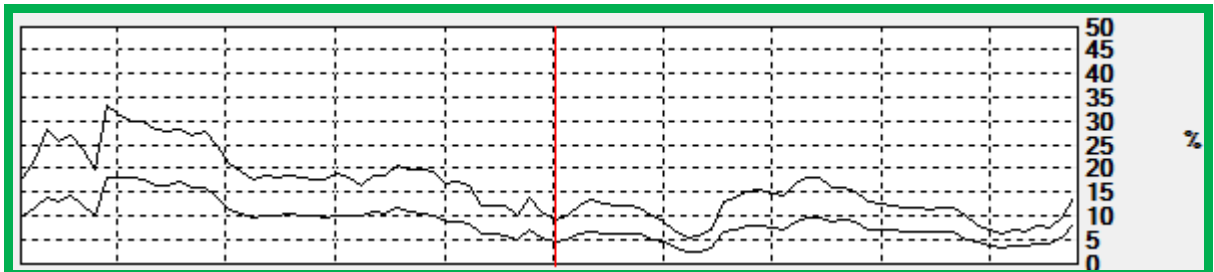
Current



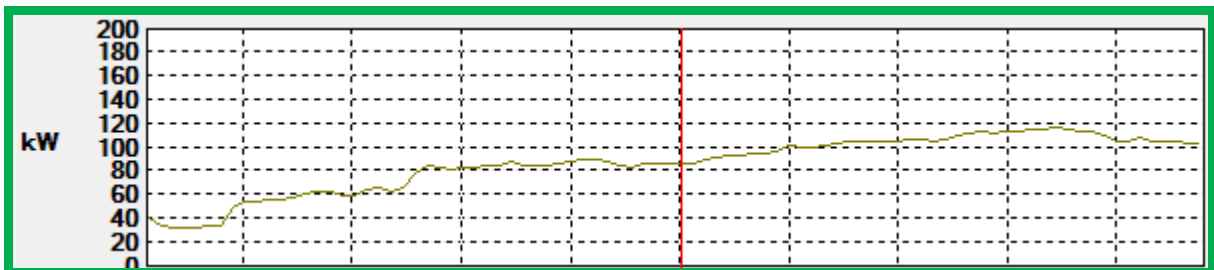
Current Harmonics



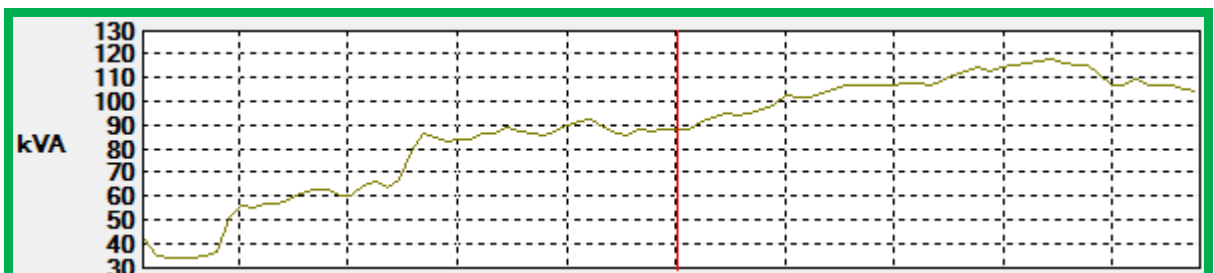
Current Un-balance



Power in KW

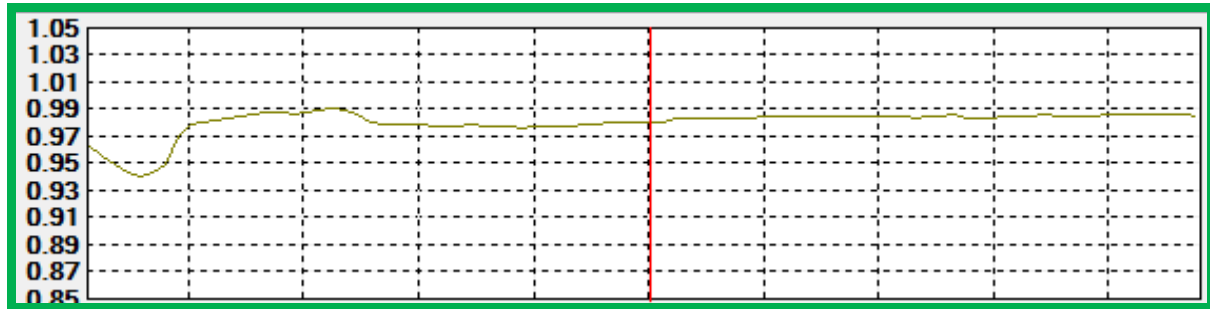


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	412.60	411.40	410.00	34.40	51.90	50.90	0.89	0.97	0.94	50.06	0.10	5.70
MAX	415.30	415.60	414.70	146.30	168.30	182.50	0.99	0.99	0.99	50.07	0.30	33.60
AVG	413.68	412.63	412.25	104.96	131.65	132.73	0.97	0.99	0.98	50.07	0.22	16.21

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.42	0.43	0.43	1.01	1.00	1.01	1.00	0.90	1.00	11.60	6.80	10.40
MAX	0.55	0.59	0.57	1.07	1.02	1.04	3.80	3.50	3.50	24.70	16.50	20.50
AVG	0.54	0.58	0.56	1.03	1.02	1.02	2.53	2.39	2.41	17.35	13.14	13.96

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.40	1.41	1.41	1.46	1.45	1.48



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

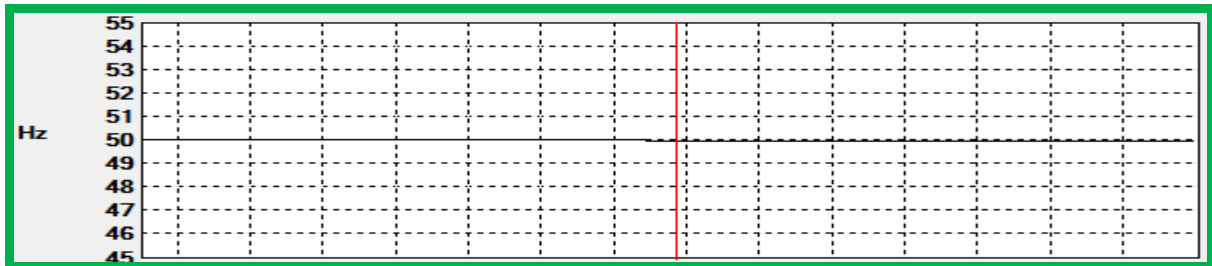


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.45	1.46	1.45	1.97	1.76	1.89
AVG	1.44	1.44	1.44	1.62	1.55	1.61

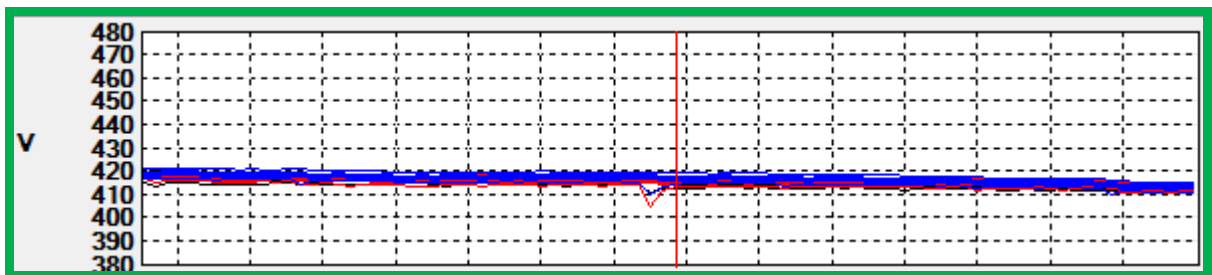


**B23-For-History Law Substation-B, Civil (SS-B)**

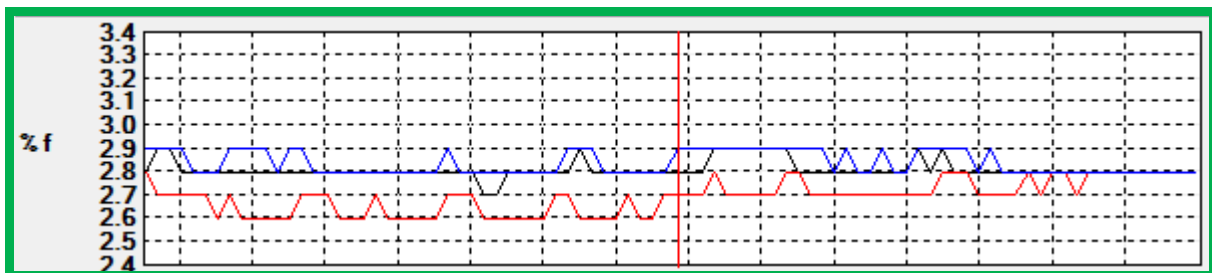
Frequency



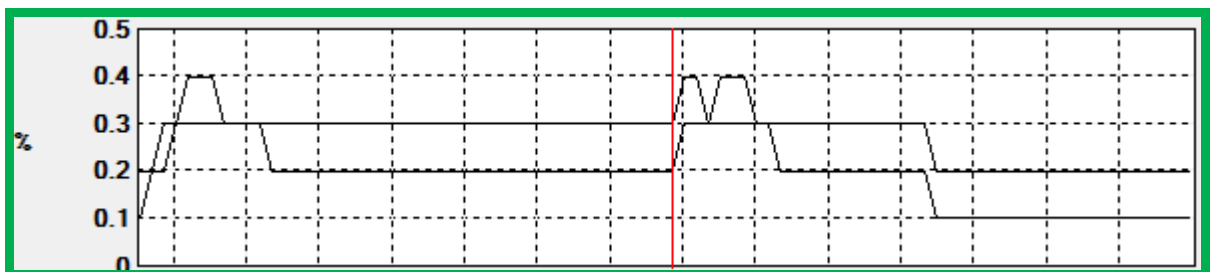
Voltage



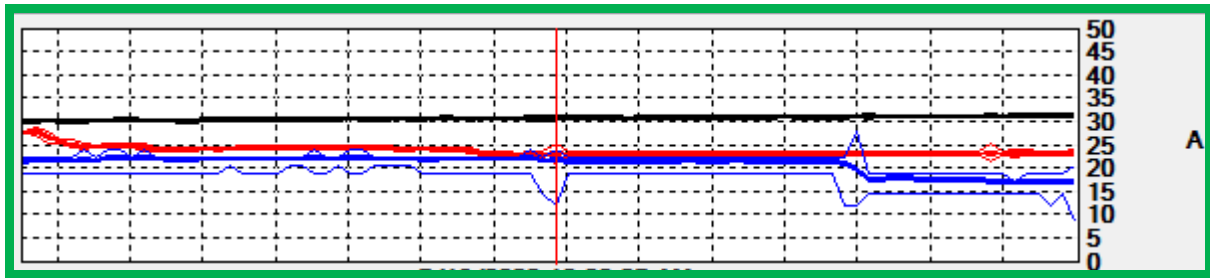
Voltage Harmonics



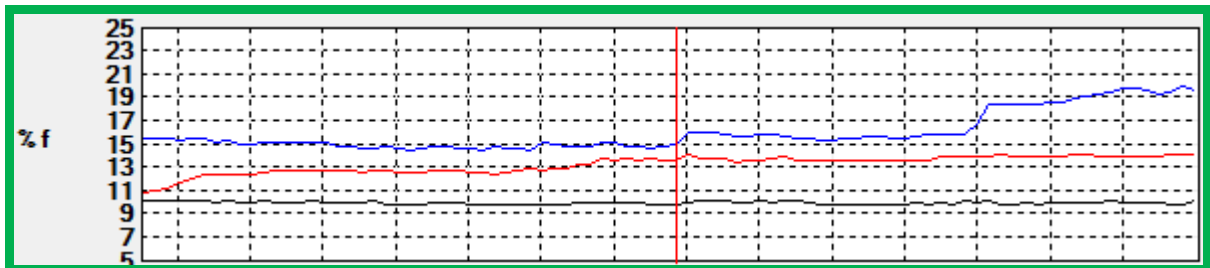
Voltage Un-balance



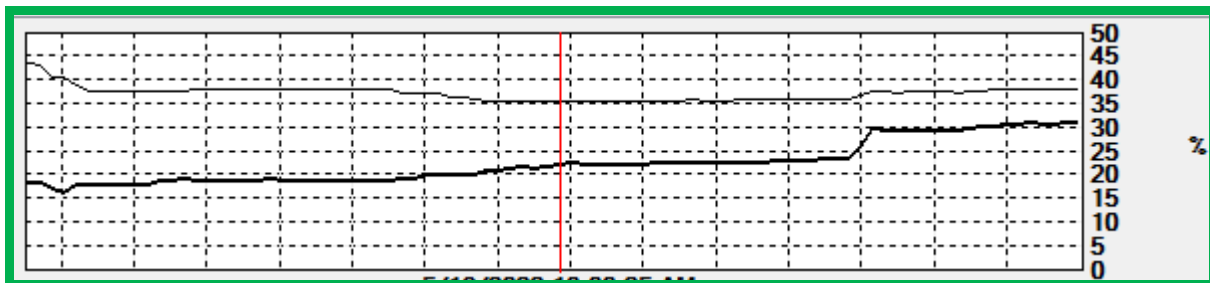
Current



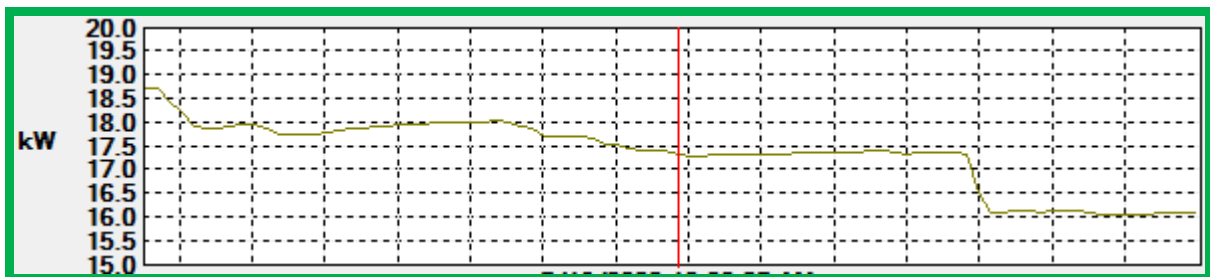
Current Harmonics



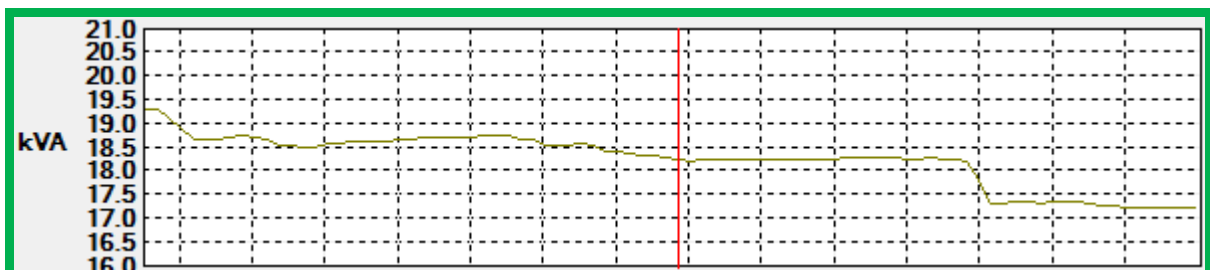
Current Un-balance



Power in KW



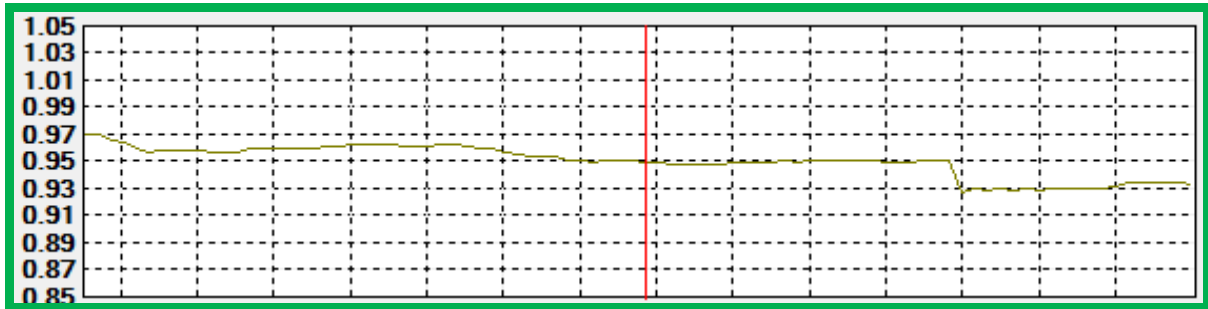
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	413.10	412.80	413.30	30.26	23.02	17.20	0.99	0.93	0.81	49.94	0.10	0.20
MAX	417.90	419.00	419.40	31.48	27.87	22.50	0.99	0.99	0.93	50.04	0.30	0.40
AVG	415.59	415.81	417.01	30.87	23.94	21.08	0.99	0.95	0.89	50.00	0.20	0.28

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.03	1.03	1.06	2.70	2.60	2.80	9.80	10.90	14.50
MAX	---	---	---	1.03	1.05	1.10	2.80	2.80	3.00	10.20	14.20	20.00
AVG	---	---	---	1.03	1.04	1.07	2.72	2.73	2.89	9.99	13.28	16.04

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.46	1.46	1.47	1.52	1.52	1.67



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.46	1.47	1.47	1.54	1.63	1.98
AVG	1.46	1.46	1.47	1.53	1.60	1.74

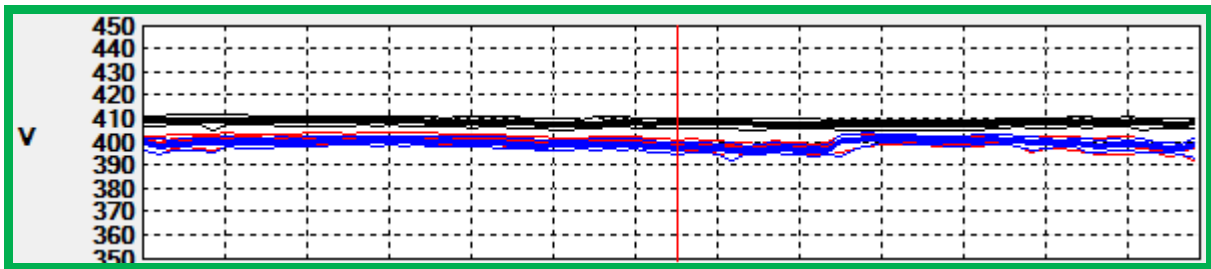


### B24-For- Examination Centre (SS-B)

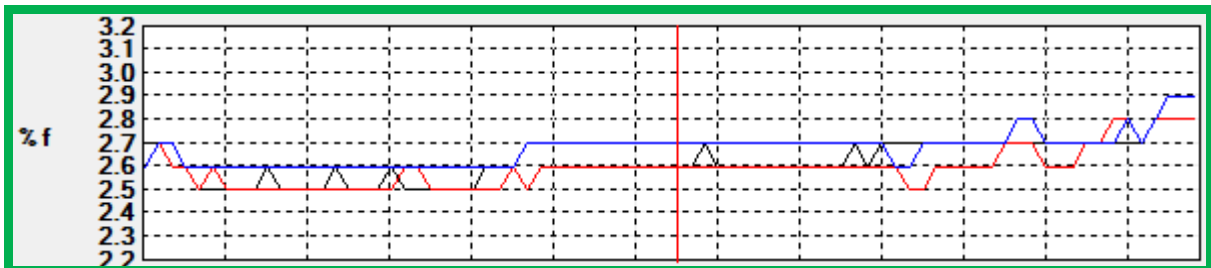
Frequency



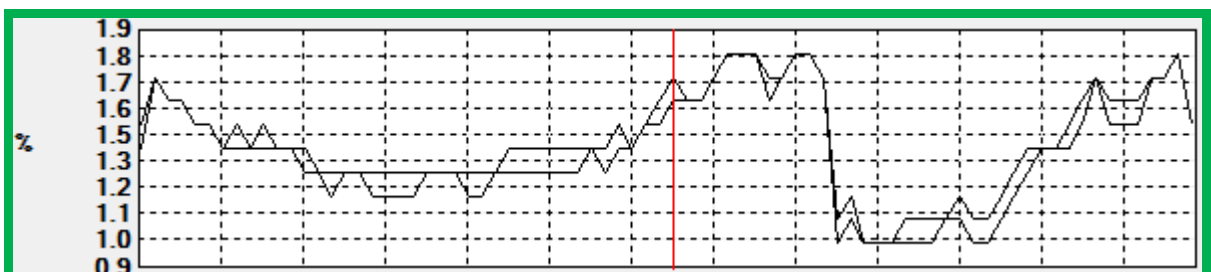
Voltage



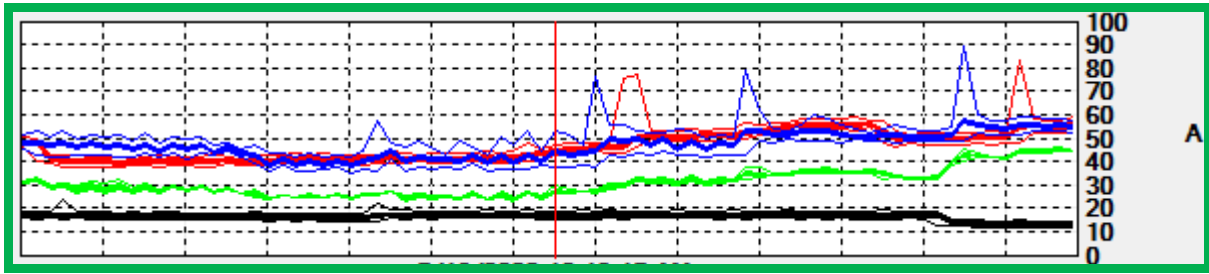
Voltage Harmonics



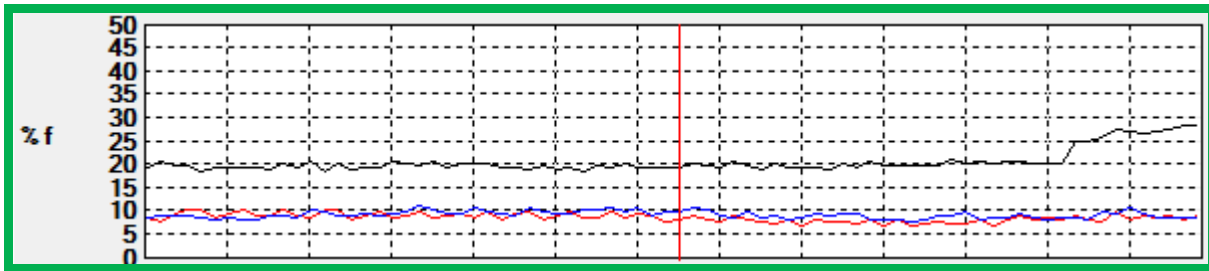
Voltage Un-balance



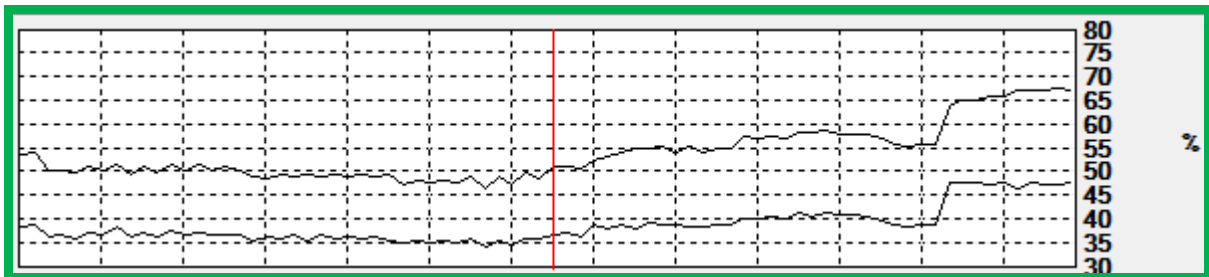
Current



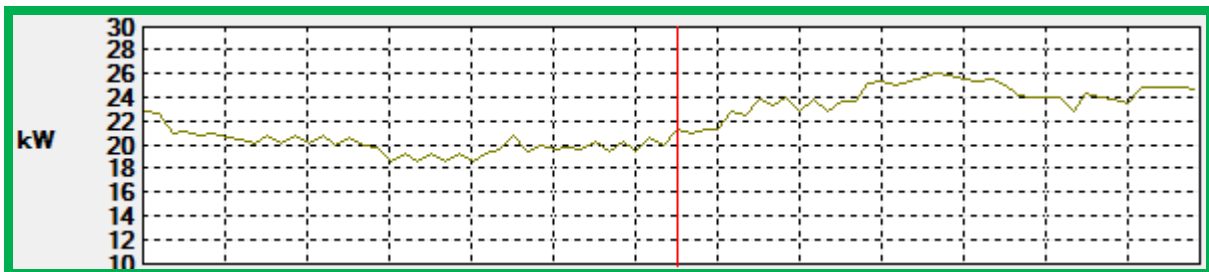
Current Harmonics



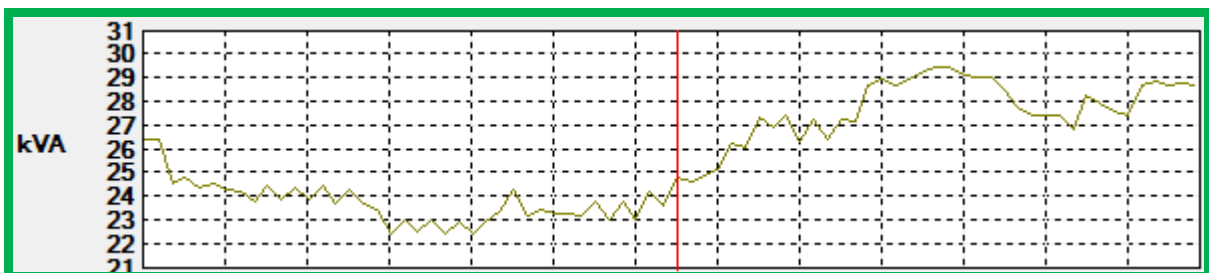
Current Un-balance



Power in KW

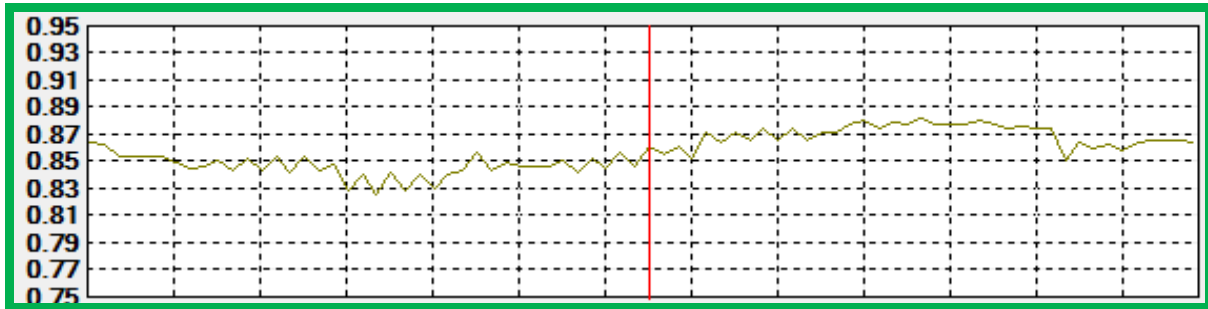


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	407.40	397.00	396.20	13.42	39.65	38.79	0.16	0.94	0.87	49.95	1.00	46.70
MAX	409.90	402.10	401.50	17.75	56.34	58.01	0.52	0.97	0.94	50.04	1.90	67.60
AVG	408.52	400.18	399.44	16.83	46.65	47.36	0.44	0.96	0.91	49.98	1.44	54.02

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.83	1.00	1.39	1.09	1.01	1.01	2.50	2.50	2.50	18.60	6.90	7.90
MAX	0.83	1.00	1.39	1.21	1.02	1.02	2.80	2.80	2.80	28.40	10.50	11.00
AVG	0.83	1.00	1.39	1.11	1.02	1.02	2.59	2.60	2.64	20.69	8.67	9.25

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.46	1.46	1.46	1.93	1.53	1.58



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

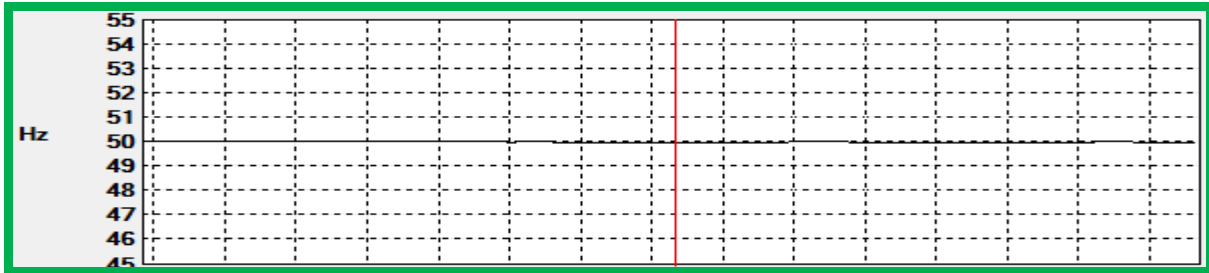


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.46	1.46	1.47	2.24	1.73	1.81
AVG	1.46	1.46	1.47	2.01	1.60	1.65

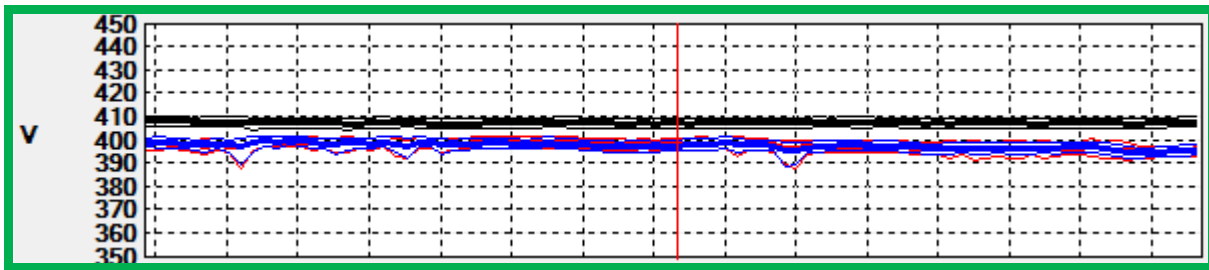


**B25-For-KP HOSTEL, RK Hostel Panel 2nd (SS-B)**

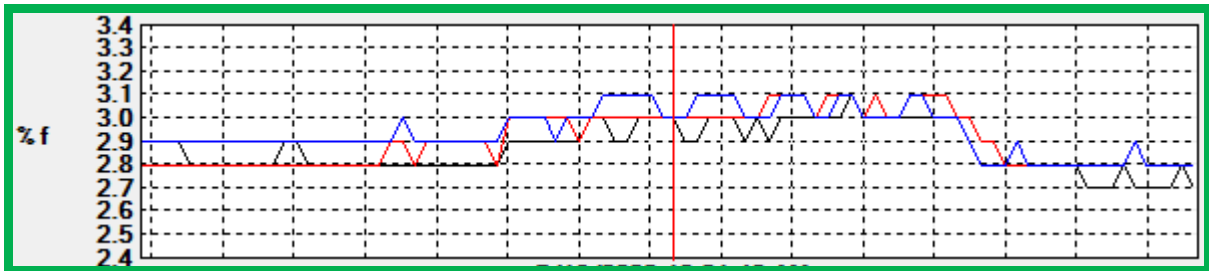
Frequency



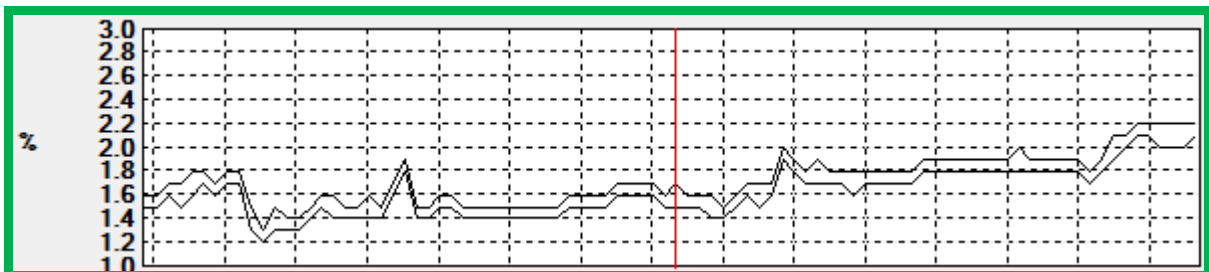
Voltage



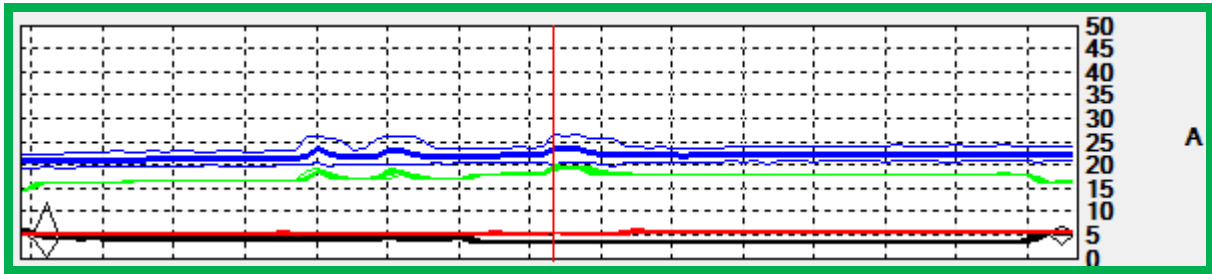
Voltage Harmonics



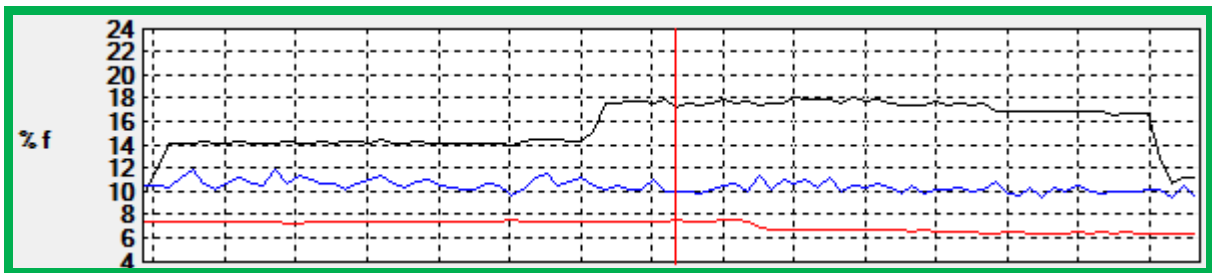
Voltage Un-balance



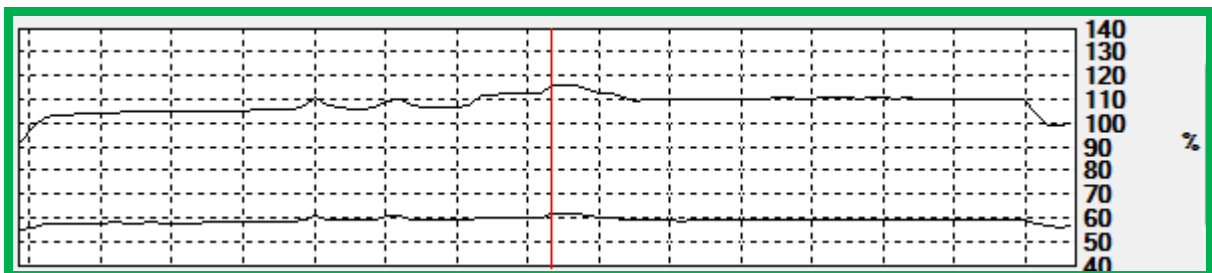
Current



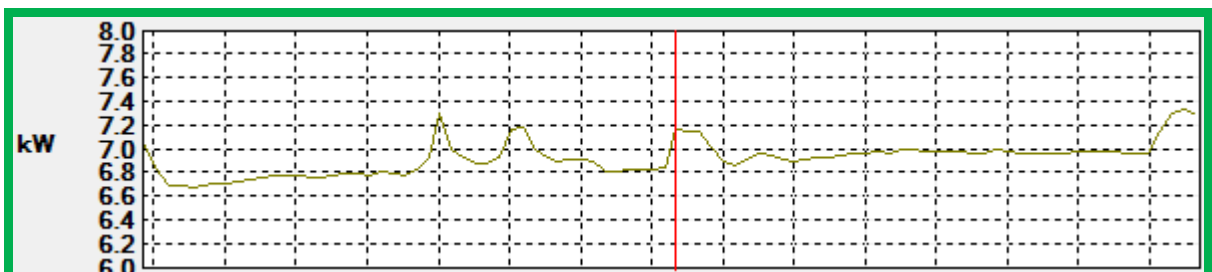
Current Harmonics



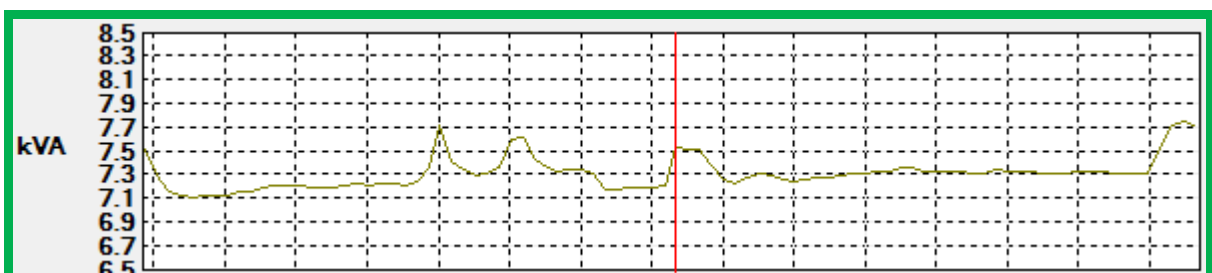
Current Un-balance



Power in KW



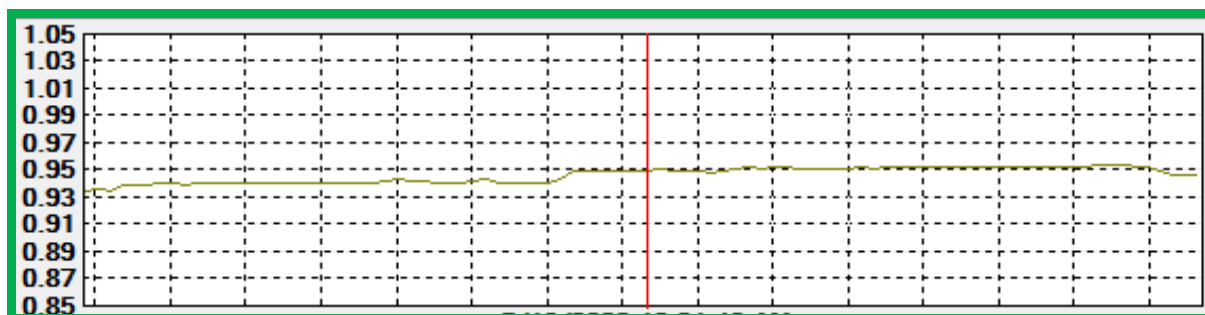
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	407.00	394.70	394.40	3.61	5.50	20.97	0.71	0.92	0.99	49.99	1.30	92.90
MAX	408.30	399.60	399.80	6.12	5.94	23.73	0.77	0.95	0.99	50.04	2.10	116.30
AVG	407.56	397.75	397.68	4.06	5.67	22.15	0.74	0.93	0.99	50.01	1.64	108.38

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.61	0.66	0.55	1.04	1.01	1.01	2.70	2.70	2.70	10.10	6.40	9.50
MAX	0.83	1.00	1.39	1.14	1.02	1.01	3.00	3.10	3.10	18.10	7.60	11.90
AVG	0.76	0.89	1.12	1.10	1.02	1.01	2.87	2.89	2.92	15.74	7.10	10.50

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.46	1.46	1.46	1.52	1.45	1.52



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

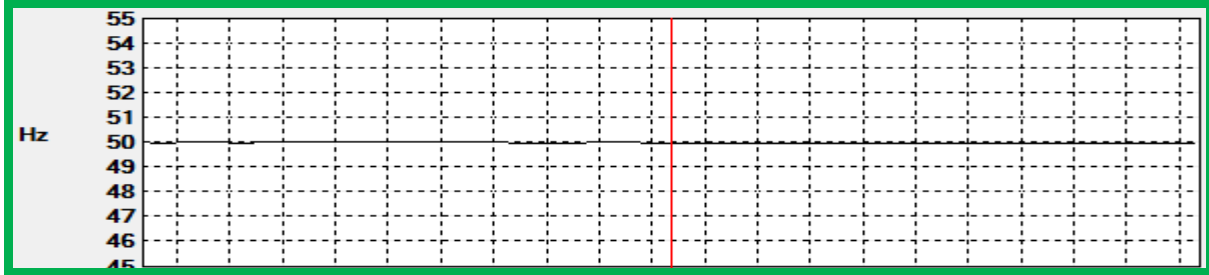


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.47	1.47	1.48	1.81	1.48	1.65
AVG	1.46	1.46	1.47	1.55	1.47	1.55

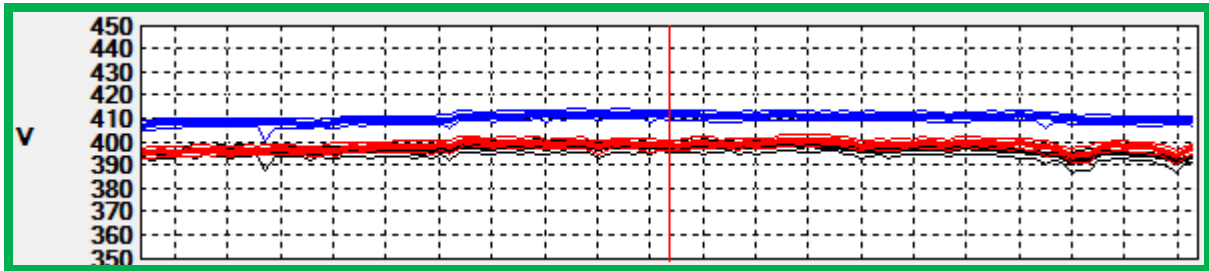


**B26-For-Farm House UG (SS-B)**

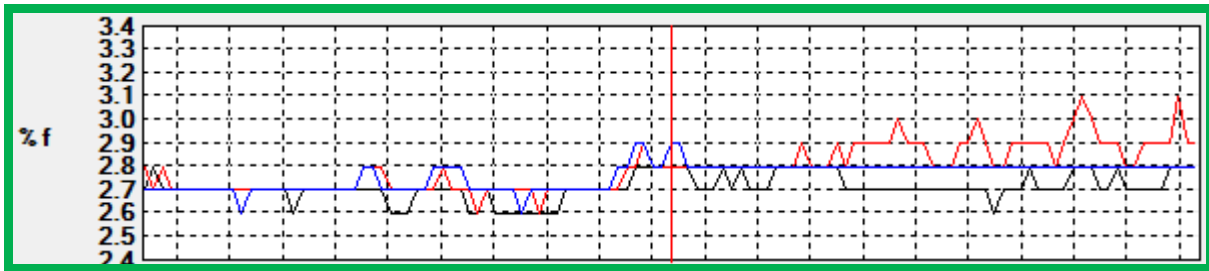
Frequency



Voltage



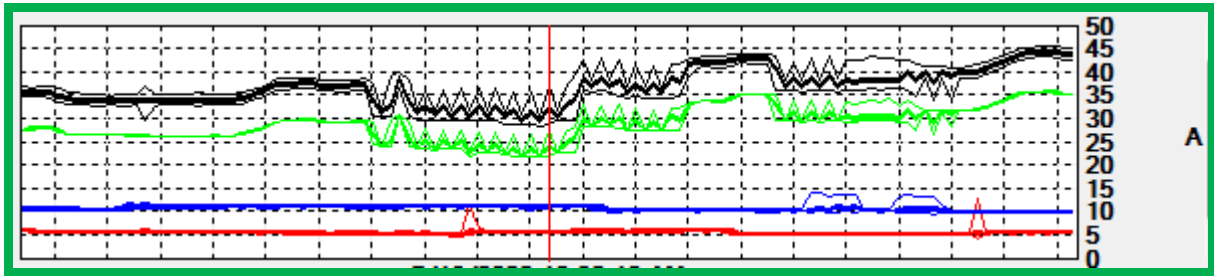
Voltage Harmonics



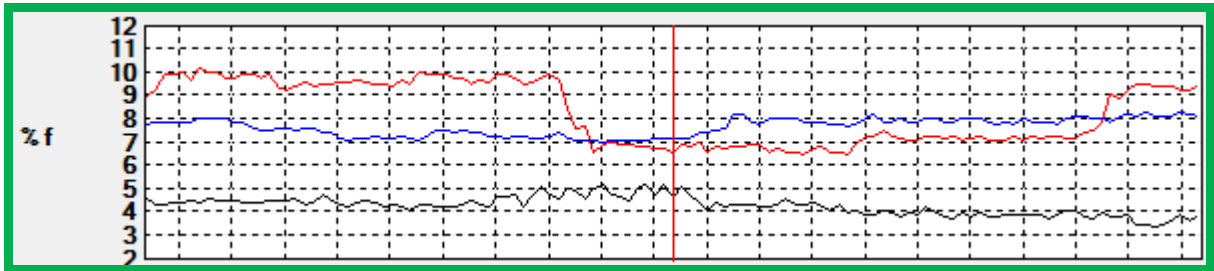
Voltage Un-balance



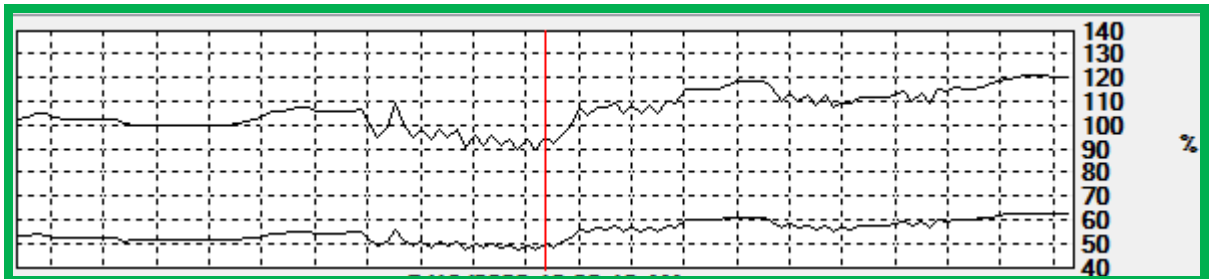
Current



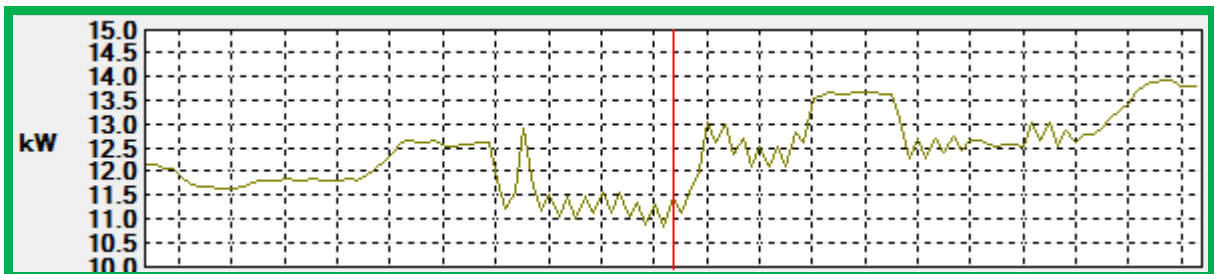
Current Harmonics



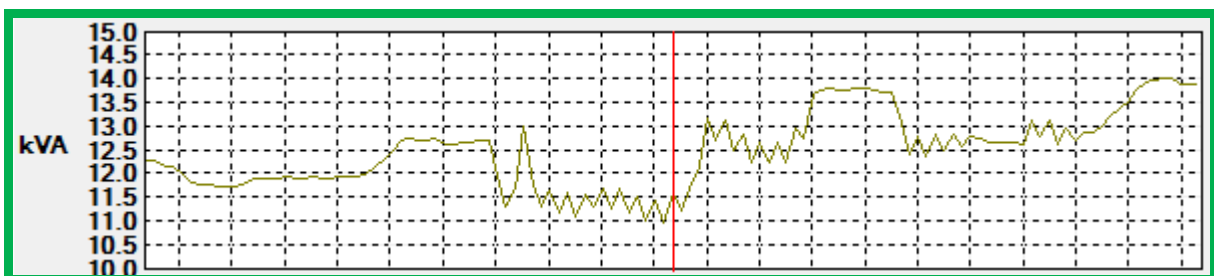
Current Un-balance



Power in KW

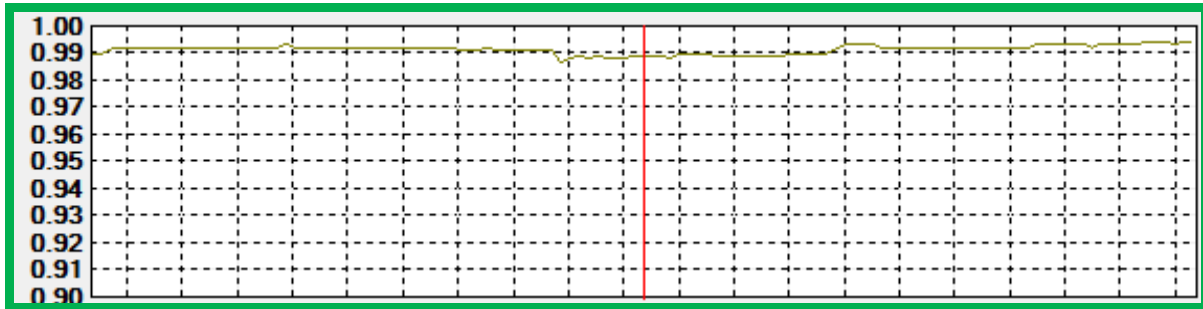


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	391.1	393.6	407.3	29.7	5.3	10.1	1.0	0.9	1.0	50.0	1.9	89.8
MAX	399.1	401.2	412.4	44.5	6.4	11.4	1.0	1.0	1.0	50.0	2.9	121.2
AVG	396.7	398.5	410.4	36.9	5.7	10.9	1.0	1.0	1.0	50.0	2.1	106.6

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.6	0.7	0.6	1.0	1.0	1.0	2.6	2.7	2.6	3.4	6.5	7.0
MAX	0.6	0.7	0.6	1.0	1.0	1.0	3.0	3.0	2.9	5.2	10.2	8.3
AVG	0.6	0.7	0.6	1.0	1.0	1.0	2.7	2.8	2.7	4.3	8.3	7.7



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



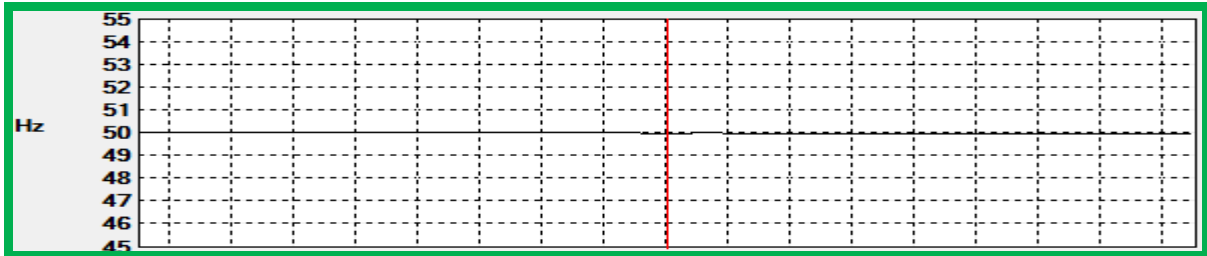
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.5	1.5	1.5	1.5	1.6	1.6
MAX	1.5	1.5	1.5	1.6	2.2	1.9
AVG	1.5	1.5	1.5	1.5	1.7	1.7

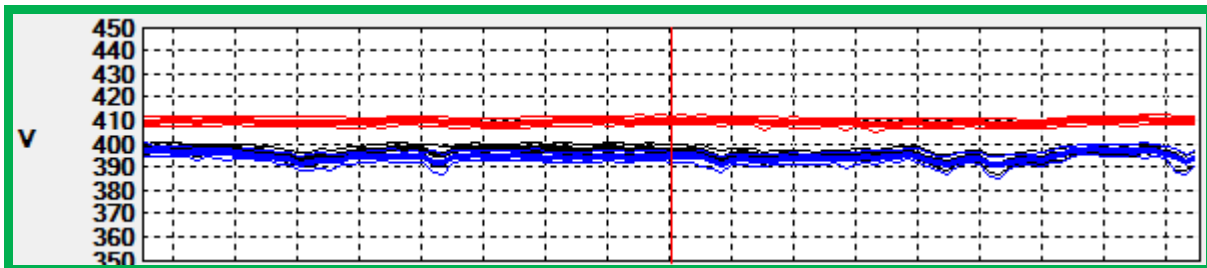


**B27-For-Physics Dept. AC (SS-B)**

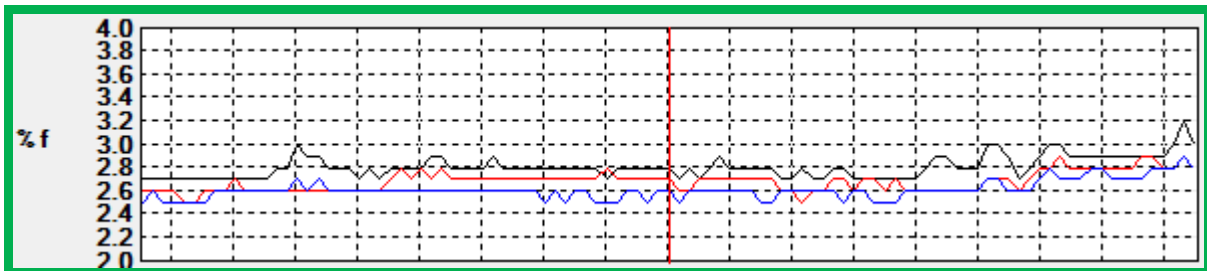
Frequency



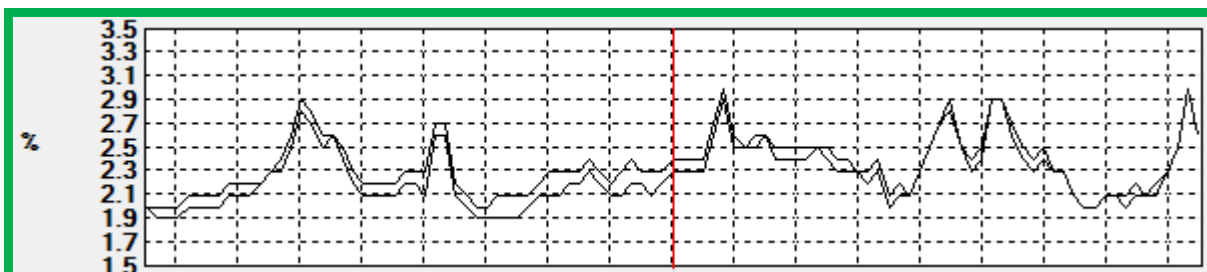
Voltage



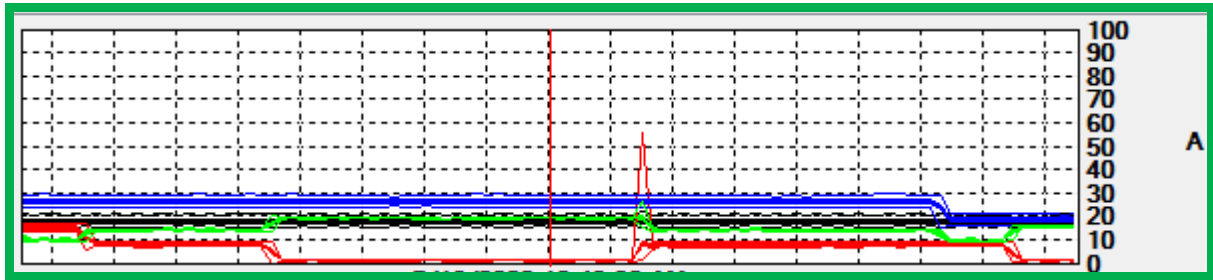
Voltage Harmonics



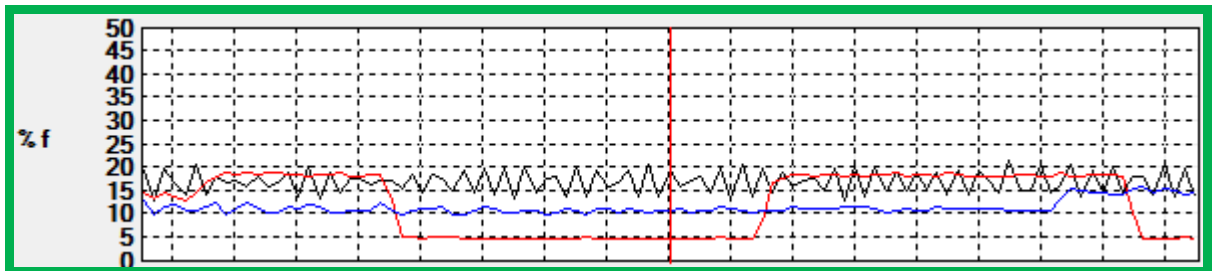
Voltage Un-balance



Current



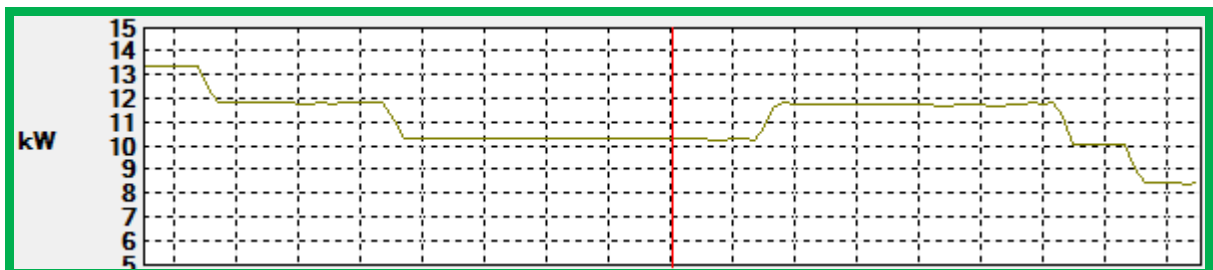
Current Harmonics



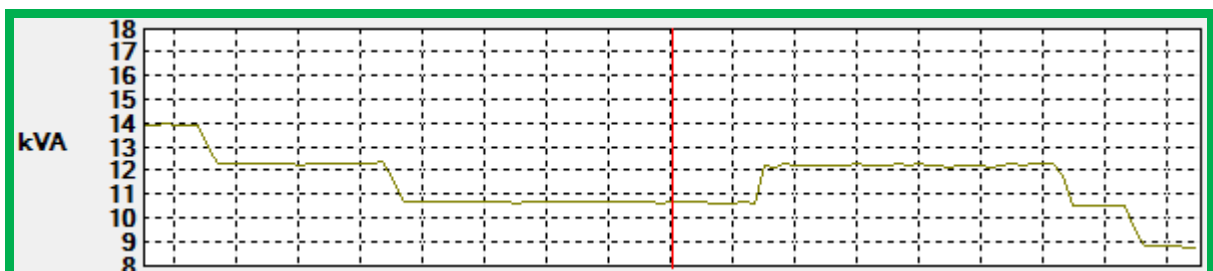
Current Un-balance



Power in KW



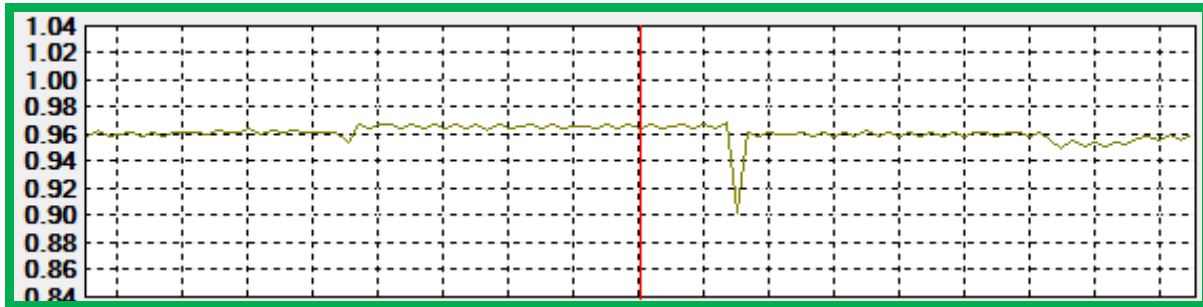
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	391.80	408.60	391.10	18.13	1.43	18.70	0.93	0.74	0.97	49.95	2.00	32.20
MAX	398.90	410.80	398.10	18.45	15.24	26.77	0.95	1.00	0.99	50.04	3.00	90.80
AVG	396.53	409.71	394.67	18.27	6.00	25.59	0.94	0.96	0.98	50.00	2.35	66.13

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	4.17	4.29	4.34	1.01	1.00	1.00	2.60	2.50	2.60	12.80	4.60	9.70
MAX	4.17	4.29	4.34	1.01	1.01	1.01	3.00	2.90	3.10	21.40	19.10	15.80
AVG	4.17	4.29	4.34	1.01	1.01	1.00	2.77	2.62	2.72	16.98	12.53	11.49

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.46	1.46	1.45	1.70	1.53	1.54



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022

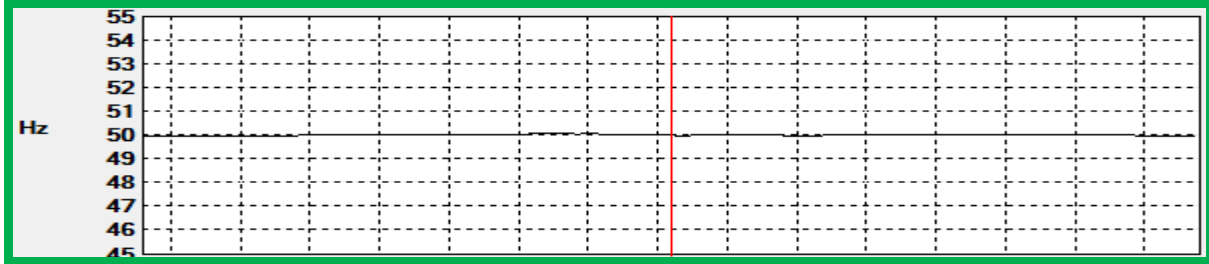


Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MAX	1.48	1.47	1.47	1.81	2.41	1.66
AVG	1.47	1.46	1.46	1.76	1.66	1.57

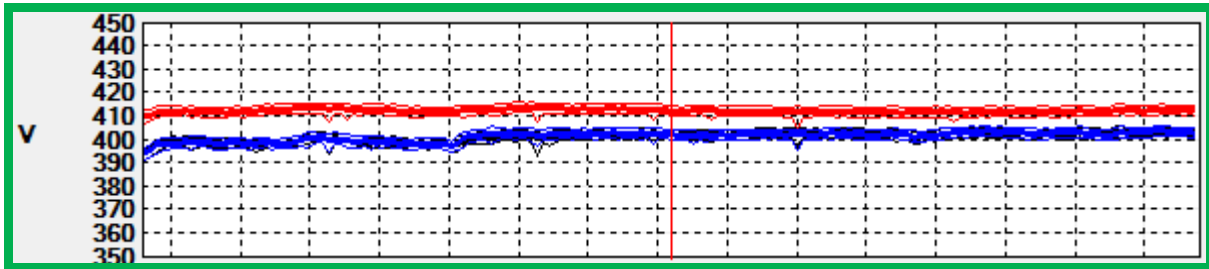


**B28-For-Campus Farm OH, (SS-B)**

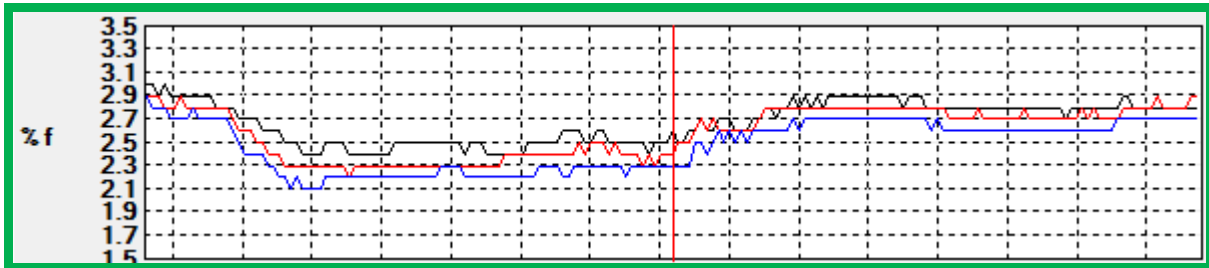
Frequency



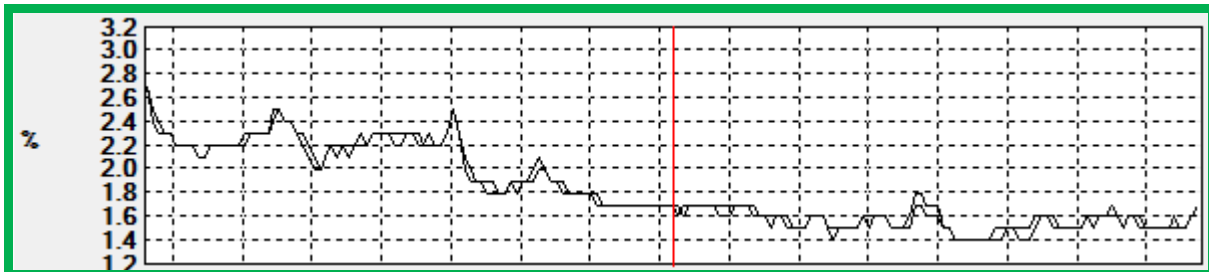
Voltage



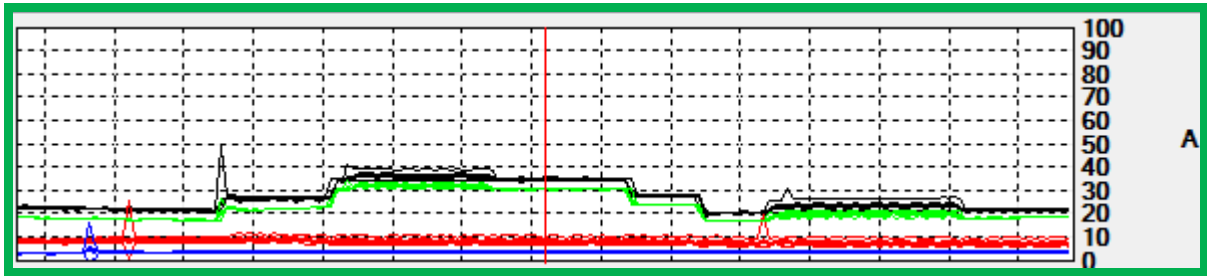
Voltage Harmonics



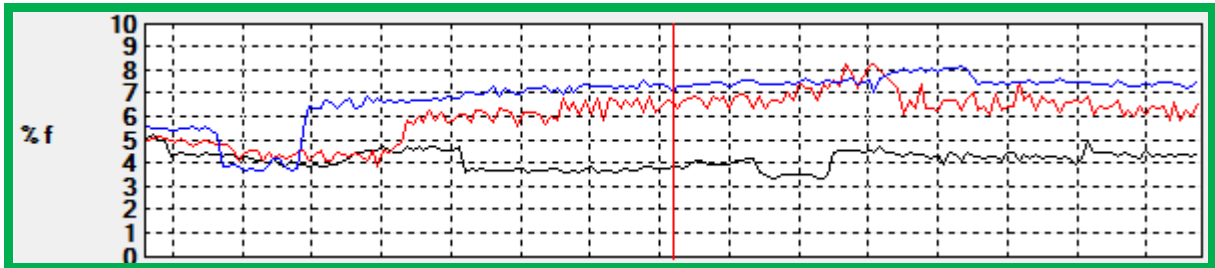
Voltage Un-balance



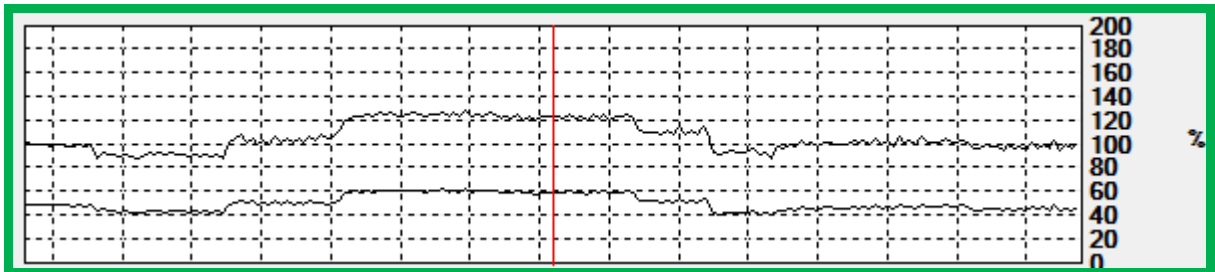
Current



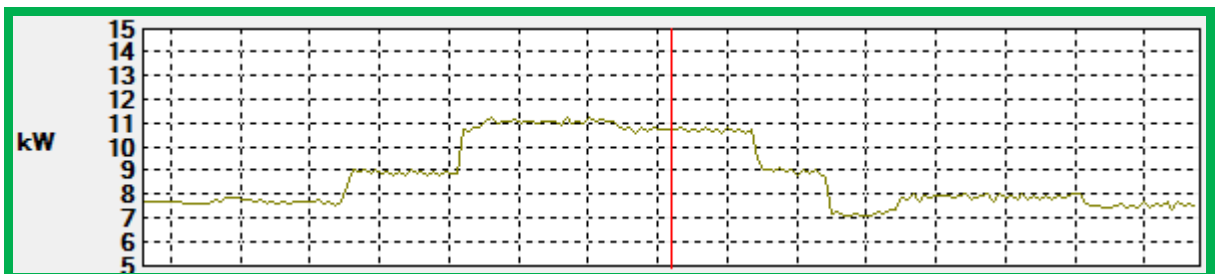
Current Harmonics



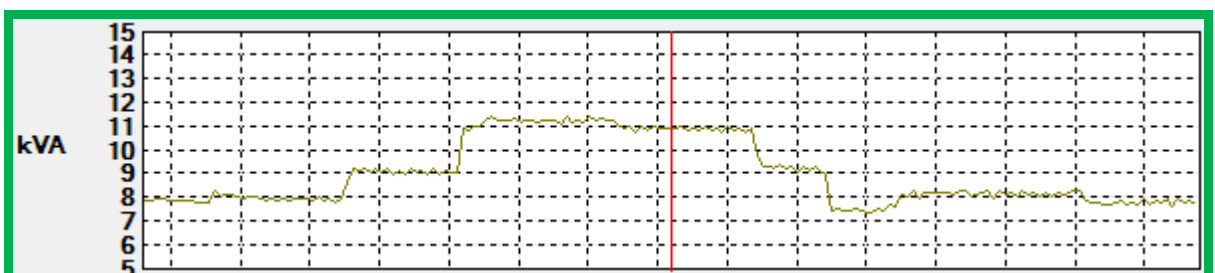
Current Un-balance



Power in KW

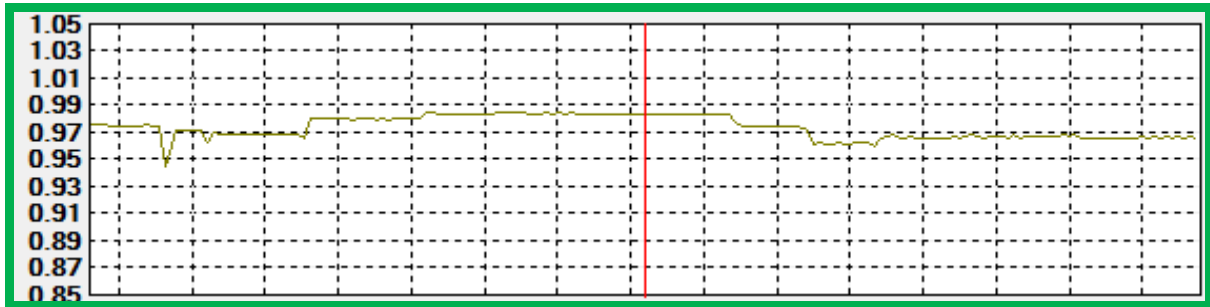


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	394.60	410.50	394.40	20.58	6.67	3.25	0.96	0.96	0.83	49.96	1.40	87.30
MAX	403.70	414.00	404.00	36.99	9.51	5.25	0.99	1.00	0.97	50.08	2.70	128.20
AVG	401.41	412.54	401.49	27.07	8.15	3.78	0.97	0.99	0.93	50.03	1.83	106.49

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.41	0.51	0.34	1.00	1.00	1.00	2.30	2.20	2.20	3.40	3.90	3.70
MAX	4.17	4.29	4.34	1.01	1.01	1.01	3.00	2.80	2.90	5.30	8.30	8.20
AVG	1.33	1.53	1.24	1.00	1.01	1.01	2.68	2.52	2.55	4.16	6.09	6.91

Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
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CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.46	1.46	1.45	1.47	1.50	1.40
MAX	1.48	1.47	1.46	1.71	1.99	1.91
AVG	1.47	1.46	1.46	1.53	1.69	1.43

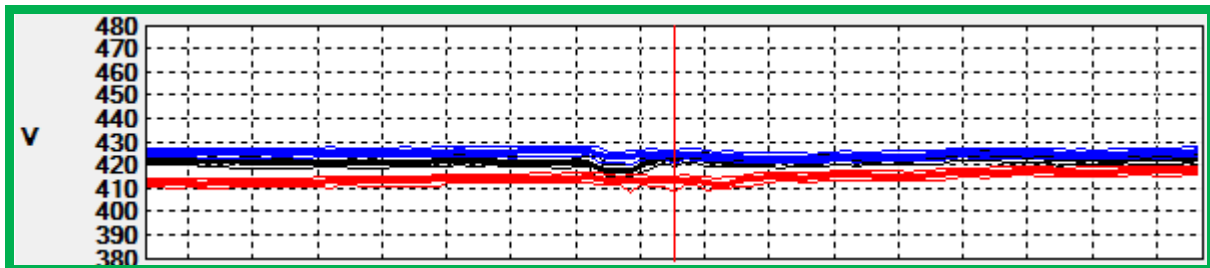


**B29-For-Brahaspati Bhawan, Horticulture Dept. (SS-B)**

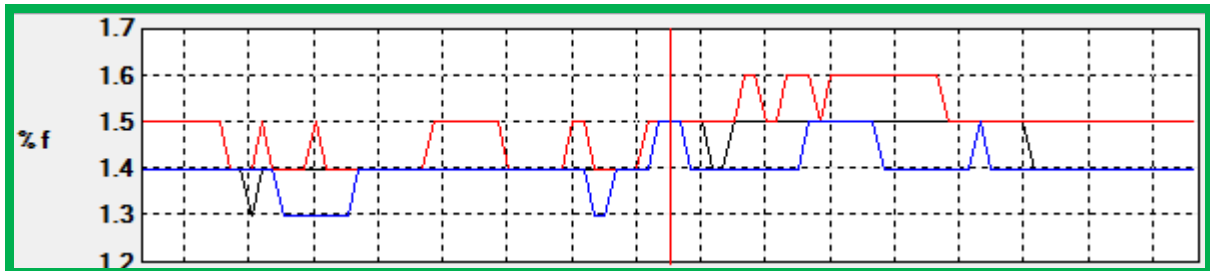
Frequency



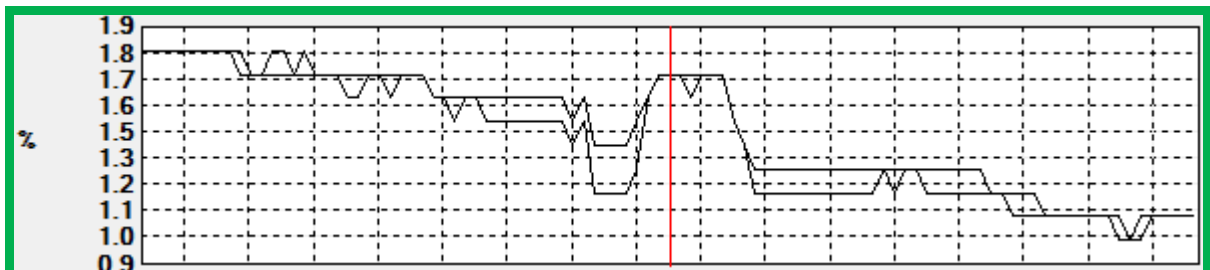
Voltage



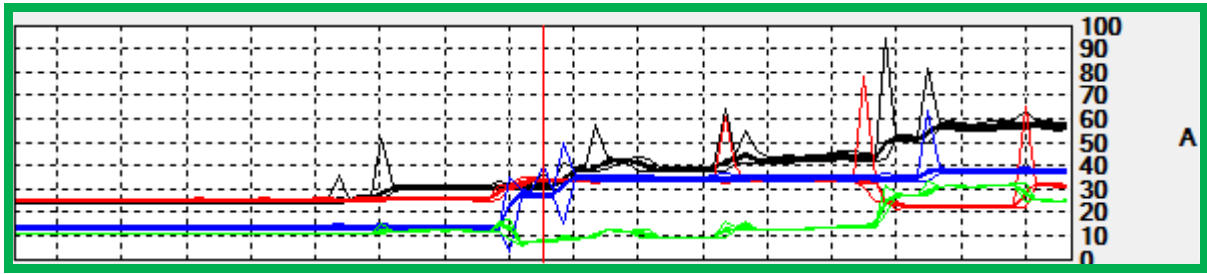
Voltage Harmonics



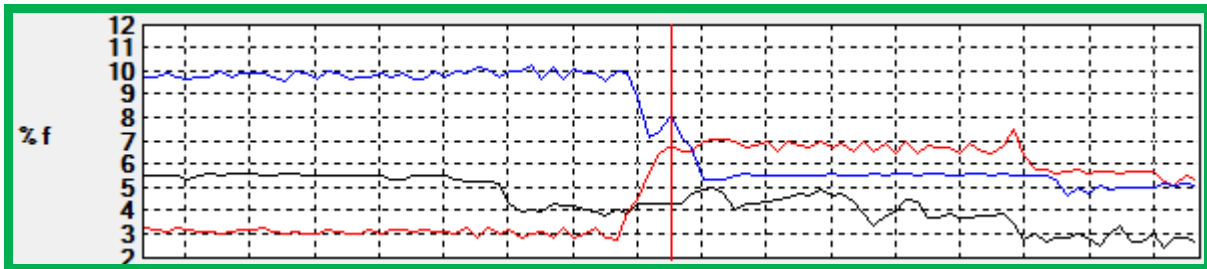
Voltage Un-balance



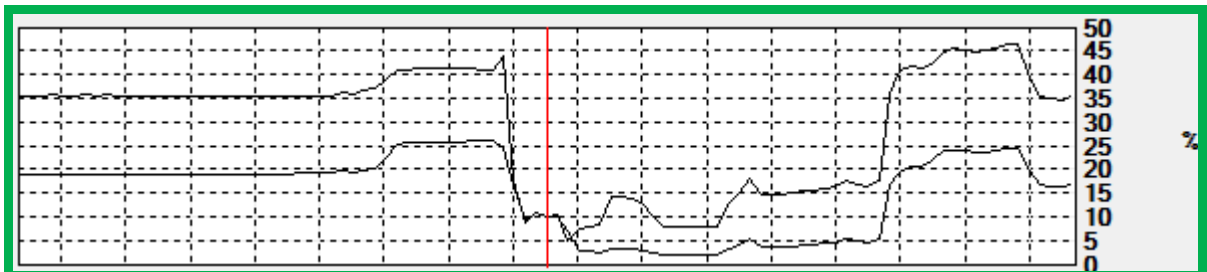
Current



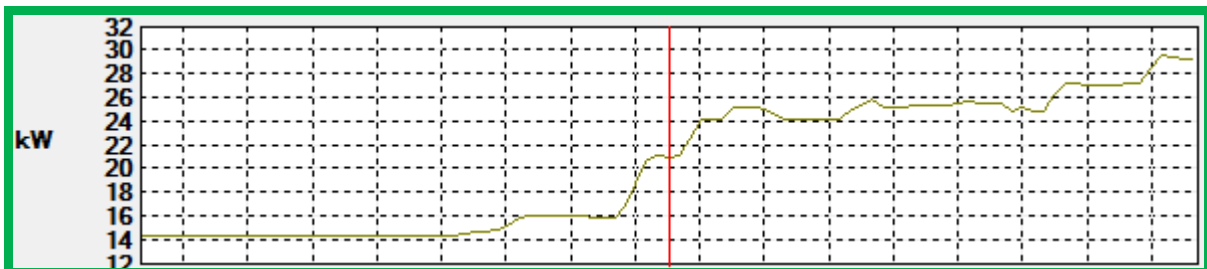
Current Harmonics



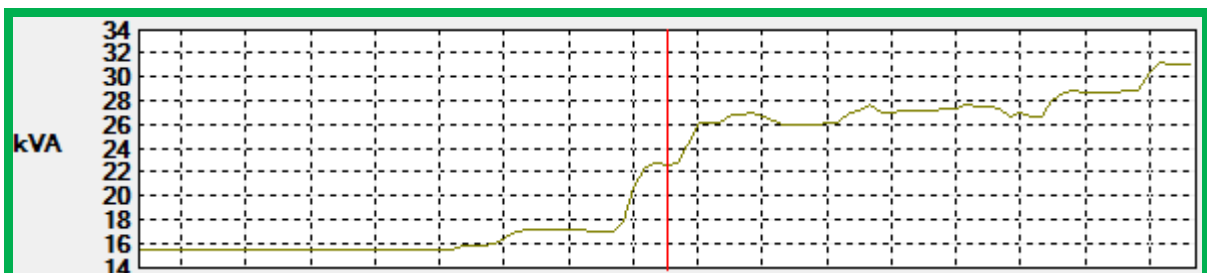
Current Un-balance



Power in KW



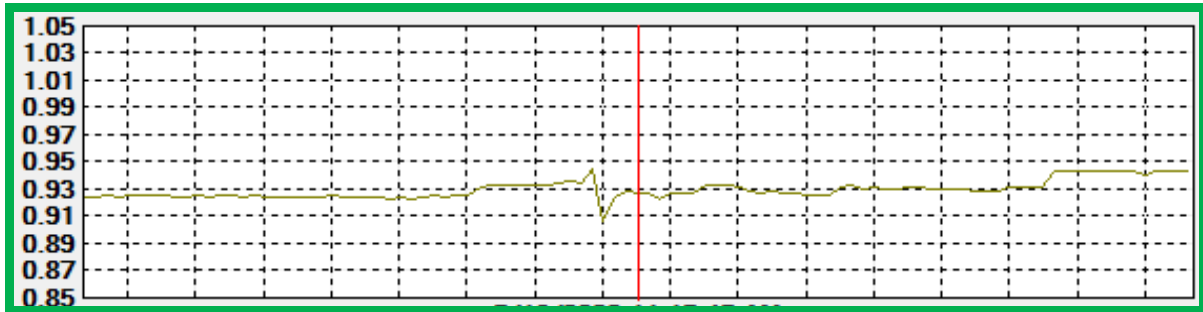
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	417.70	412.10	423.20	24.53	22.77	13.66	0.92	0.91	0.81	49.97	1.00	5.20
MAX	424.50	418.00	426.60	58.06	34.78	38.29	0.96	0.96	0.95	50.04	1.80	46.60
AVG	422.15	414.84	425.14	36.50	28.57	25.06	0.93	0.93	0.92	50.00	1.40	29.35

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.41	0.51	0.35	1.00	1.00	1.00	1.40	1.40	1.30	2.40	2.80	4.70
MAX	0.41	0.51	0.35	1.00	1.01	1.00	1.60	1.60	1.50	5.60	7.50	10.30
AVG	0.41	0.51	0.35	1.00	1.00	1.00	1.49	1.45	1.39	4.41	4.86	7.60



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



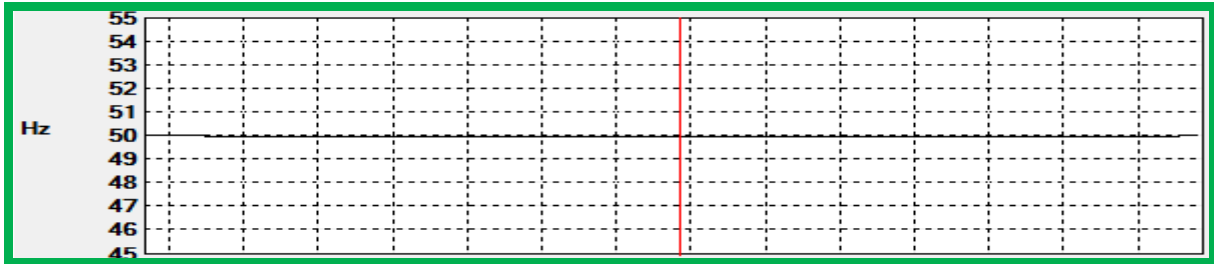
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.44	1.43	1.42	1.47	1.43
MAX	1.44	1.44	1.44	1.66	1.94	2.21
AVG	1.44	1.44	1.44	1.46	1.52	1.52

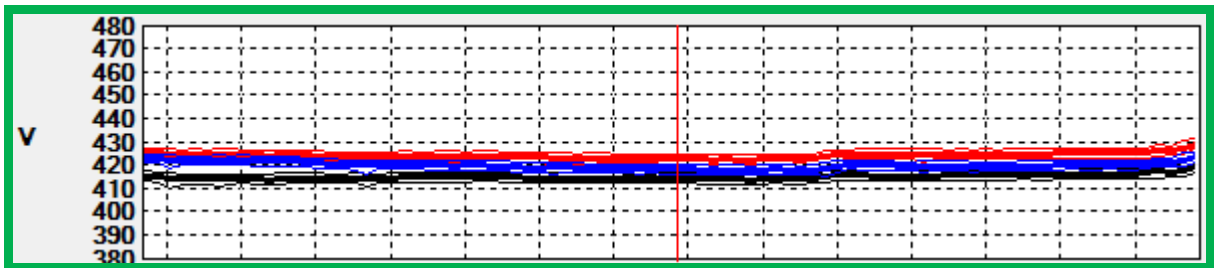


**B30-For-Canteen Library, Internet (SS-B)**

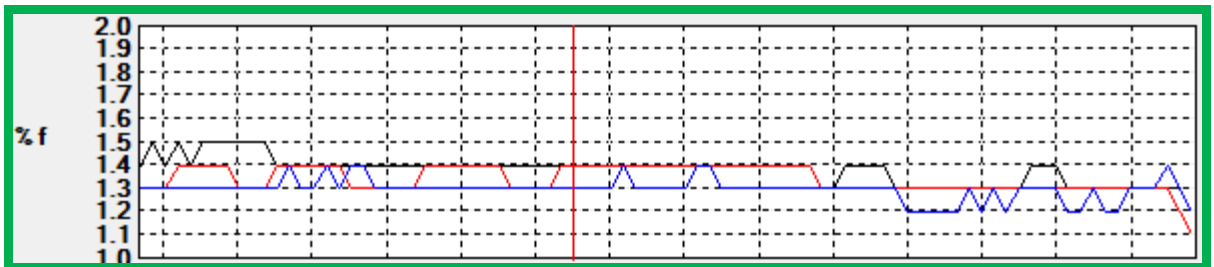
Frequency



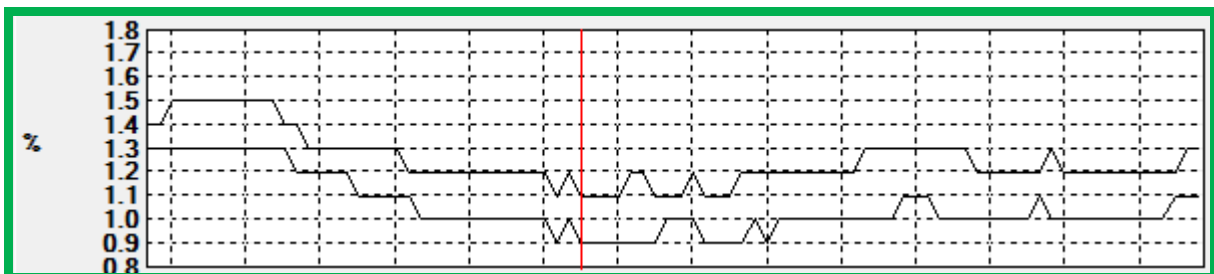
Voltage



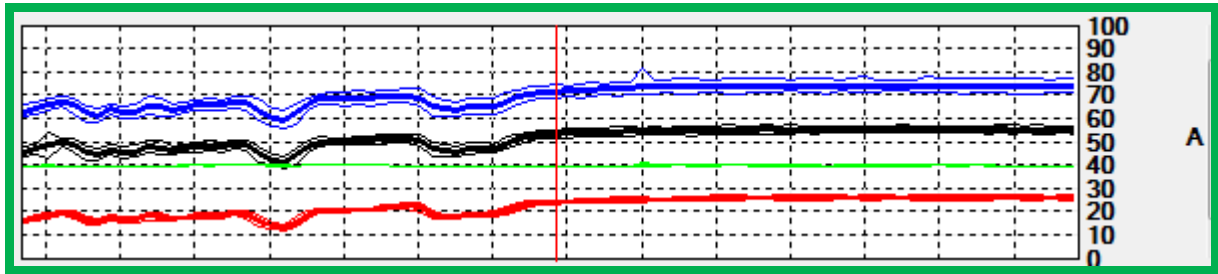
Voltage Harmonics



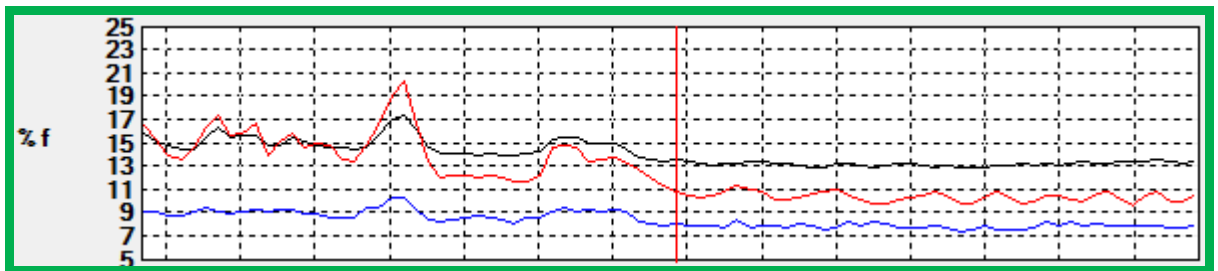
Voltage Un-balance



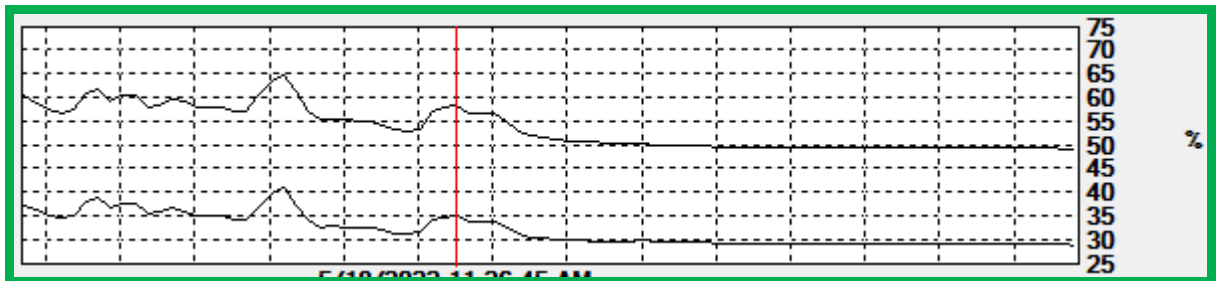
Current



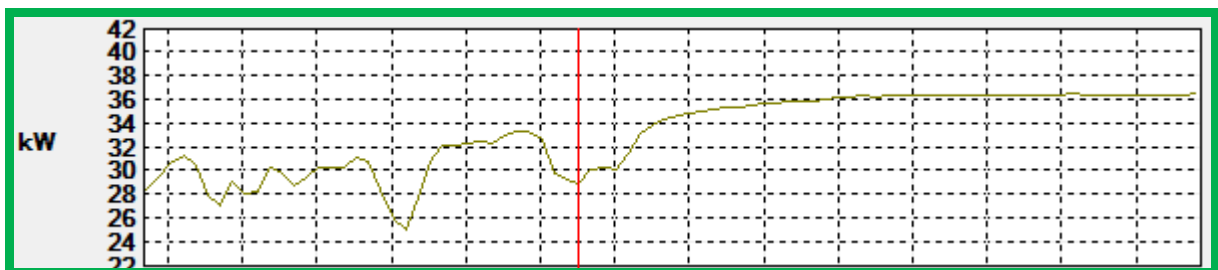
Current Harmonics



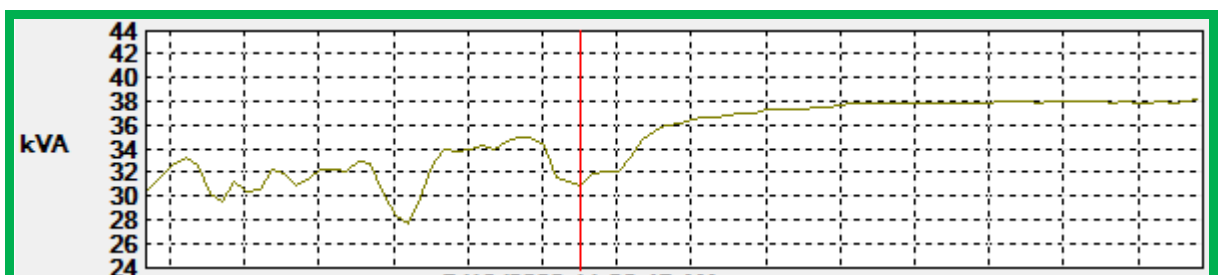
Current Un-balance



Power in KW

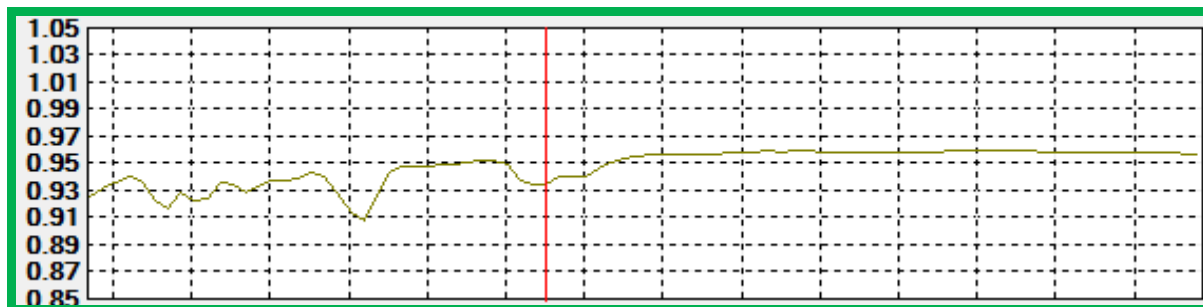


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	413.70	422.30	417.90	41.10	13.30	59.38	0.91	0.66	0.96	49.94	1.00	49.10
MAX	419.50	429.30	423.90	55.73	26.47	74.55	0.95	0.92	0.98	50.02	1.50	64.90
AVG	415.23	424.37	420.13	51.72	22.47	70.04	0.94	0.87	0.97	49.98	1.15	53.64

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.02	1.01	1.00	1.20	1.10	1.30	12.90	9.70	7.50
MAX	---	---	---	1.03	1.03	1.01	1.50	1.30	1.50	17.40	20.30	10.40
AVG	---	---	---	1.02	1.01	1.00	1.37	1.27	1.36	14.07	12.38	8.43



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



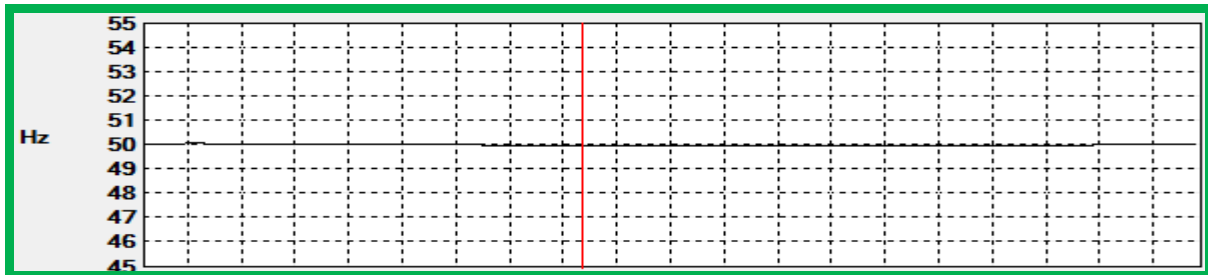
Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.59	1.48	1.49
MAX	1.44	1.44	1.44	1.81	1.60	1.60
AVG	1.44	1.44	1.43	1.64	1.52	1.53

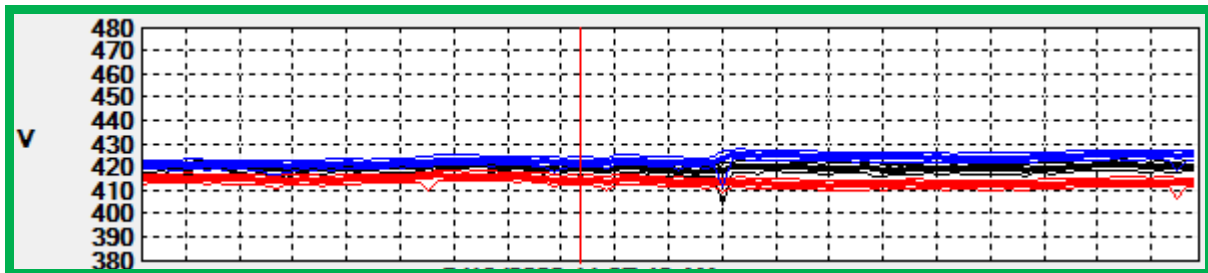


**B31-For-KP Hostel, RK Hostel Panel 1st (SS-B)**

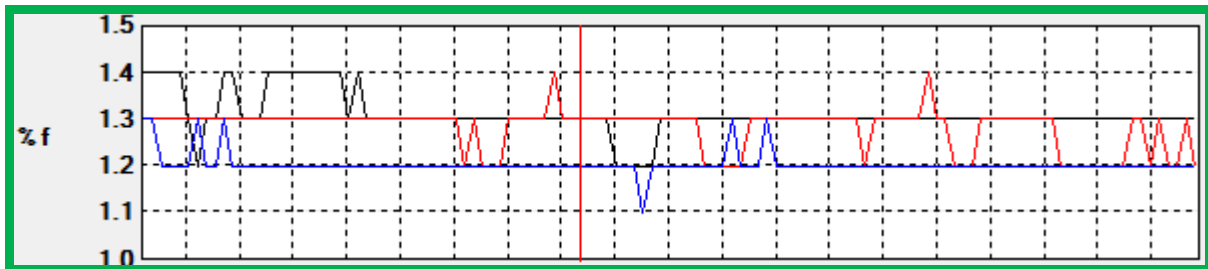
Frequency



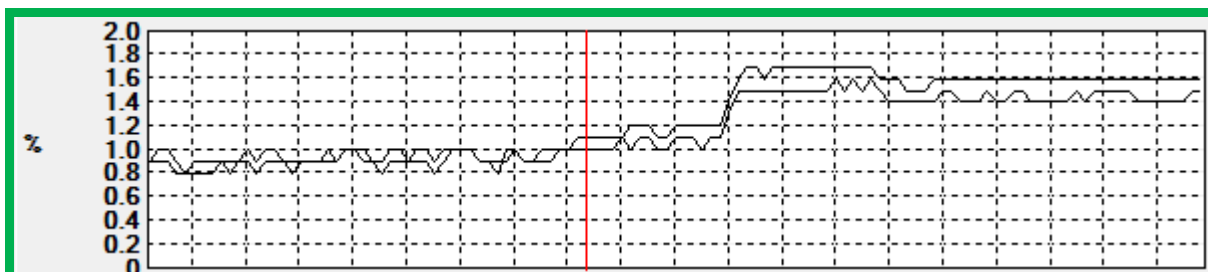
Voltage



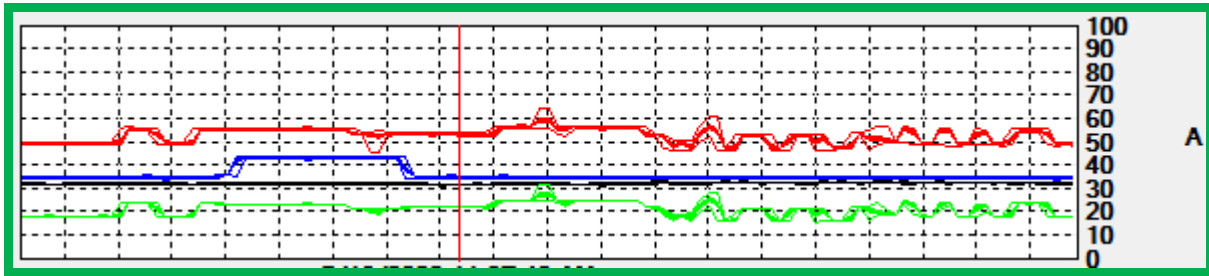
Voltage Harmonics



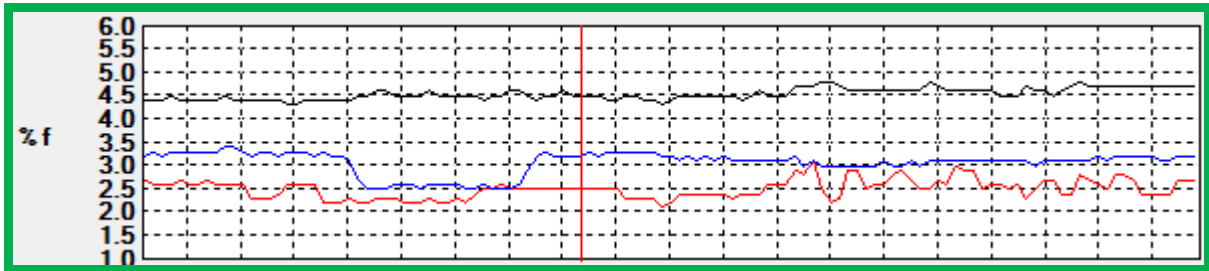
Voltage Un-balance



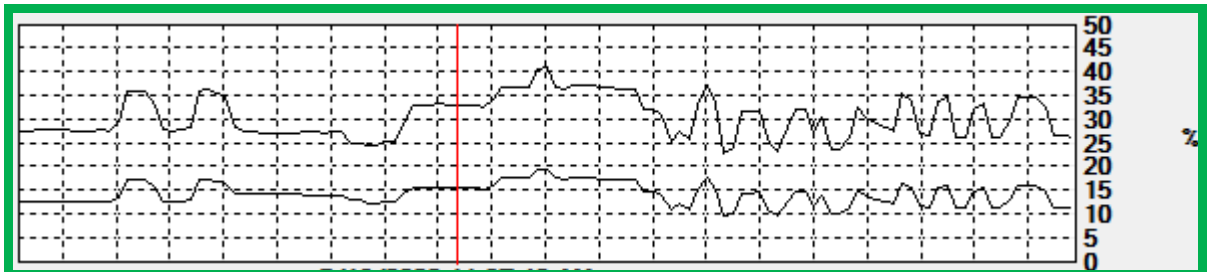
Current



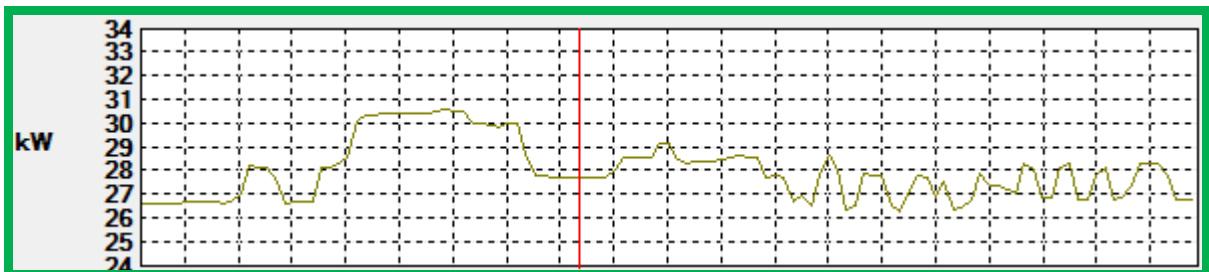
Current Harmonics



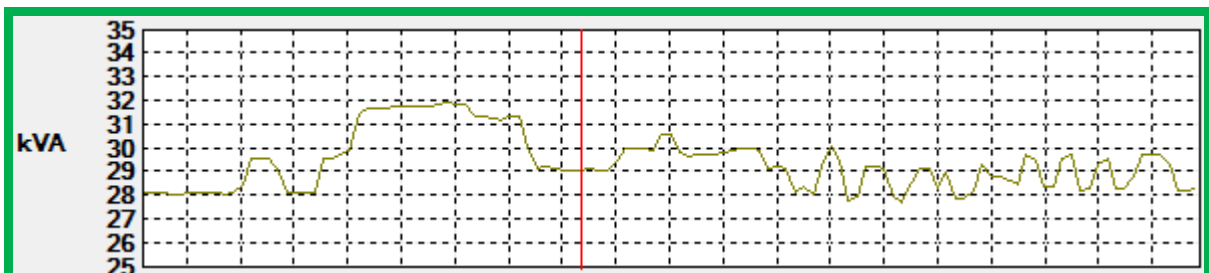
Current Un-balance



Power in KW



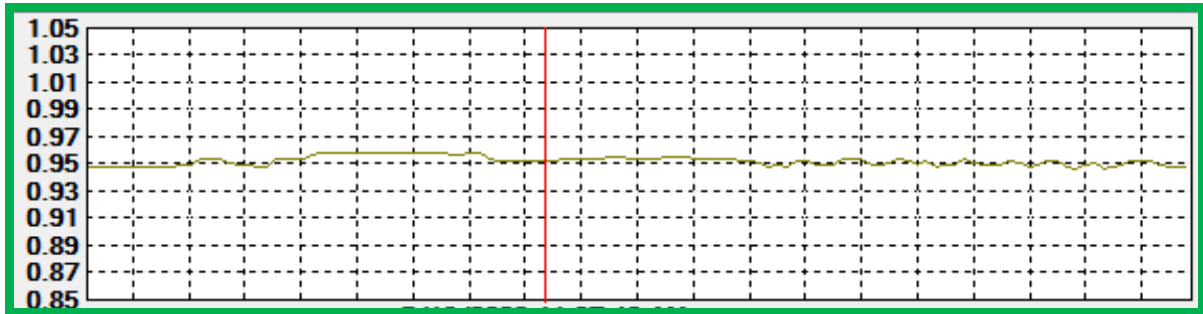
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	418.30	412.30	420.80	31.82	47.17	34.64	0.93	0.96	0.95	49.94	0.80	23.00
MAX	421.60	416.70	425.80	32.91	59.70	43.73	0.93	0.97	0.97	50.07	1.60	41.10
AVG	419.97	414.20	423.39	32.38	52.99	36.34	0.93	0.96	0.95	50.00	1.19	30.63

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.75	2.46	2.46	1.00	1.00	1.00	1.30	1.20	1.10	4.30	2.10	2.50
MAX	3.77	3.55	3.01	1.00	1.00	1.00	1.40	1.30	1.30	4.80	3.10	3.40
AVG	3.65	3.50	2.49	1.00	1.00	1.00	1.31	1.24	1.25	4.54	2.51	3.07



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



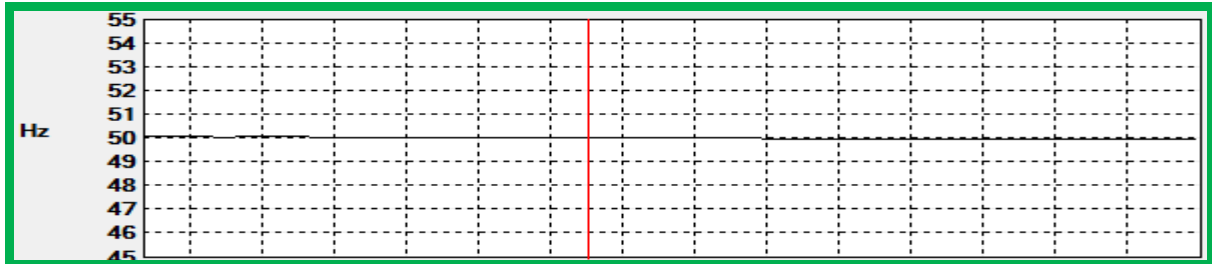
Crest Factor

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.44	1.43	1.40	1.45	1.48
MAX	1.44	1.44	1.44	1.45	1.51	1.70
AVG	1.44	1.44	1.44	1.40	1.46	1.50

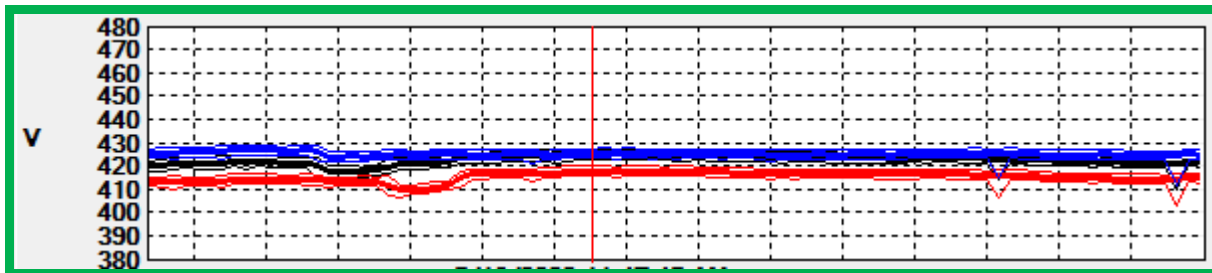


**B32-For-SS-C, Farm Tank (SS-B)**

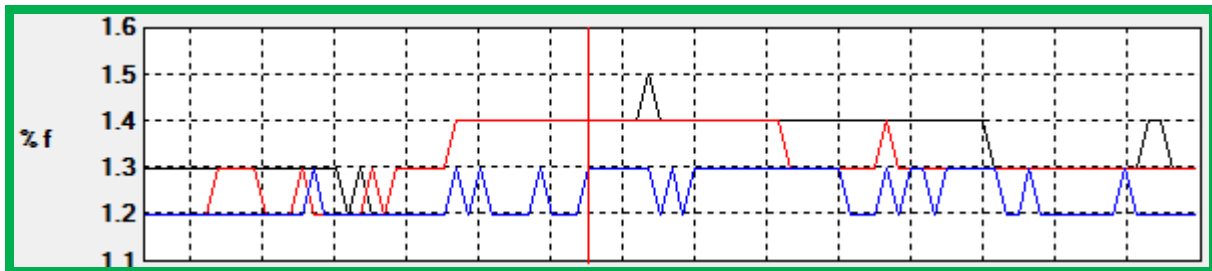
Frequency



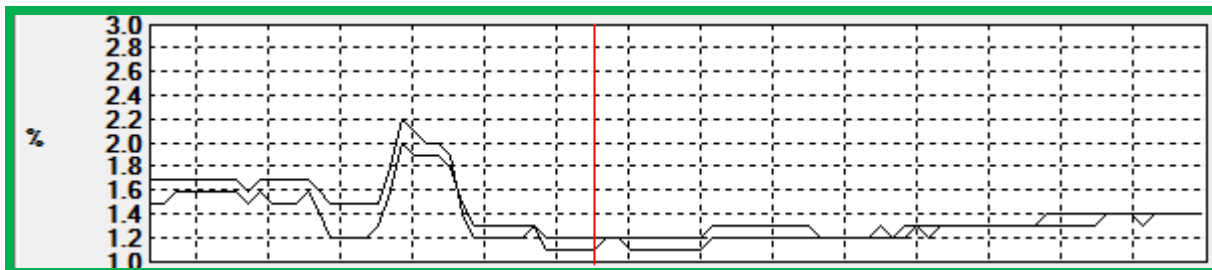
Voltage



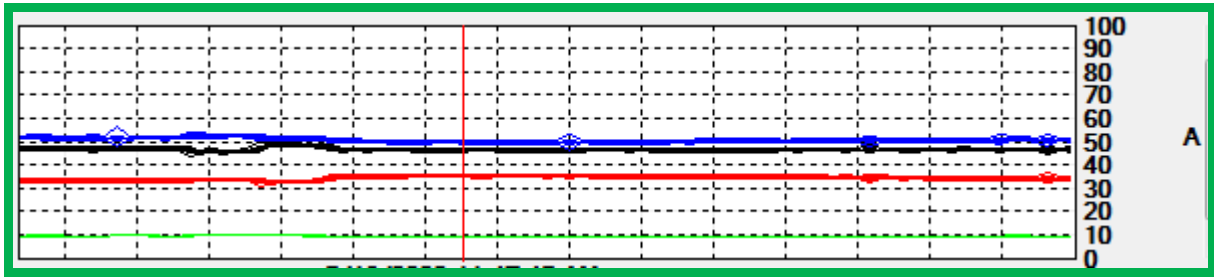
Voltage Harmonics



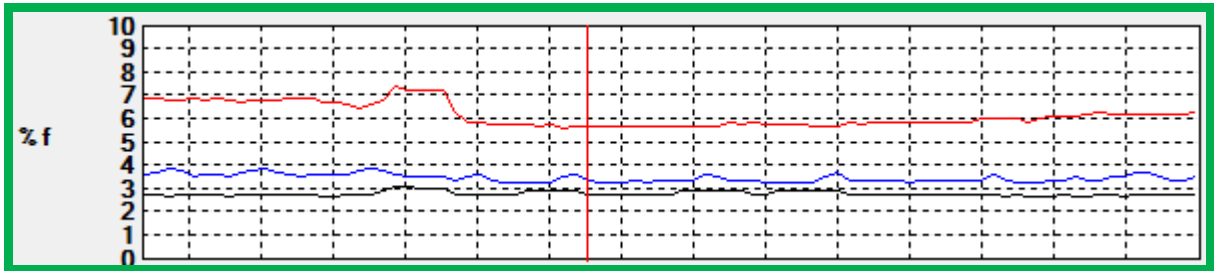
Voltage Un-balance



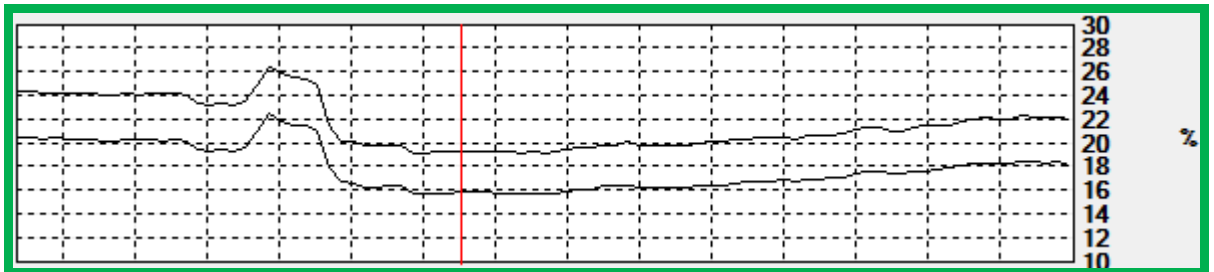
Current



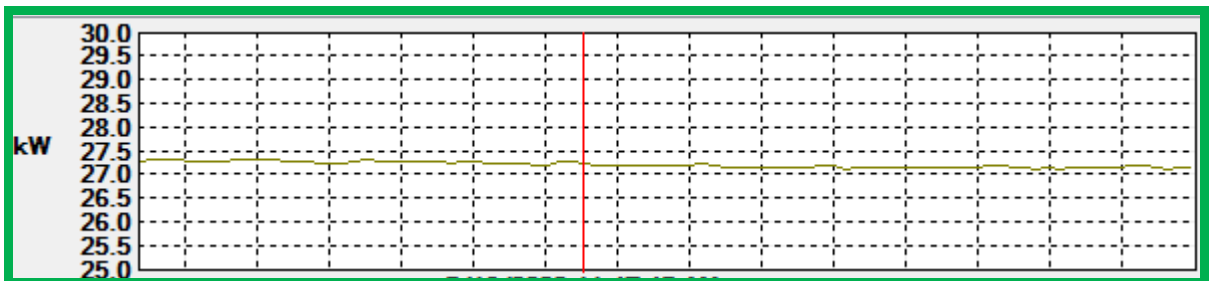
Current Harmonics



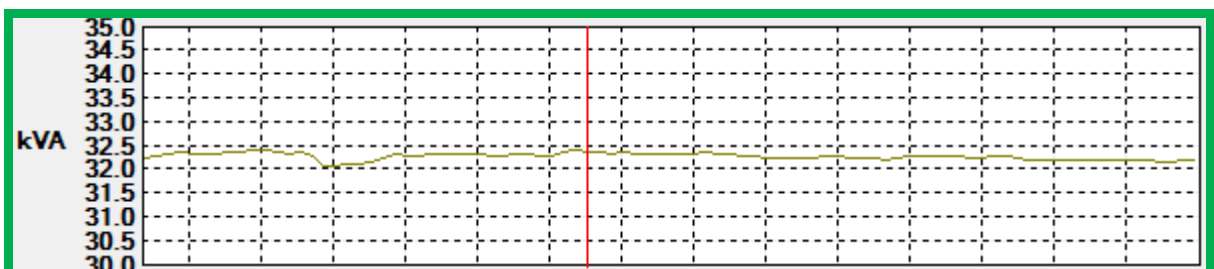
Current Un-balance



Power in KW

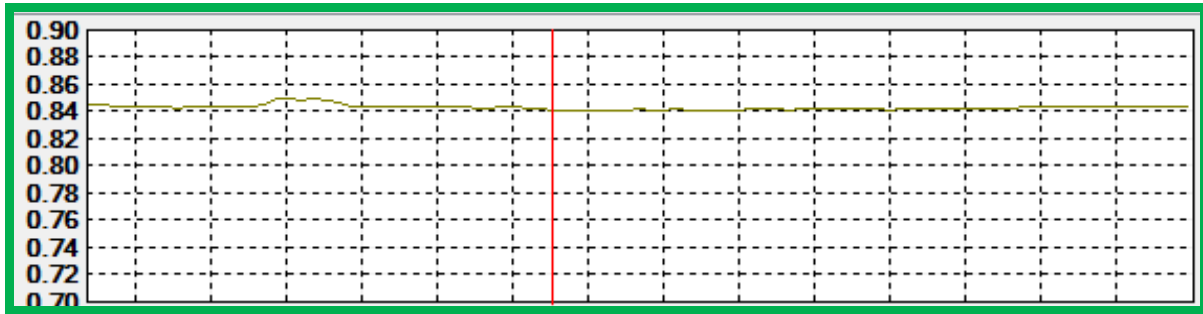


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	417.60	410.00	424.30	45.92	32.67	50.07	0.80	0.78	0.90	49.98	1.10	19.20
MAX	425.40	418.30	427.10	49.18	35.68	52.90	0.82	0.82	0.92	50.07	2.10	26.50
AVG	422.89	415.74	425.49	46.95	34.64	50.97	0.81	0.80	0.91	50.03	1.35	21.61

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.75	2.46	3.01	1.00	1.00	1.00	1.20	1.20	1.10	2.70	5.60	3.30
MAX	0.75	2.46	3.01	1.00	1.00	1.00	1.50	1.40	1.40	3.10	7.40	3.90
AVG	0.75	2.46	3.01	1.00	1.00	1.00	1.37	1.28	1.30	2.82	6.18	3.48



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



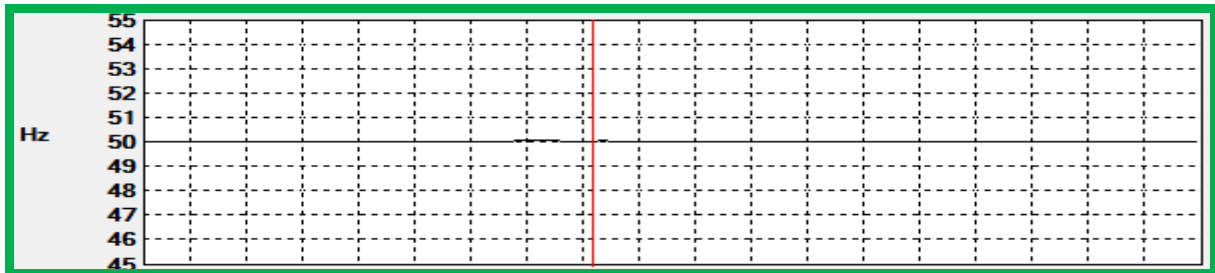
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.44	1.44	1.50	1.49	1.45
MAX	1.44	1.44	1.44	1.52	1.52	1.53
AVG	1.44	1.44	1.44	1.51	1.50	1.47

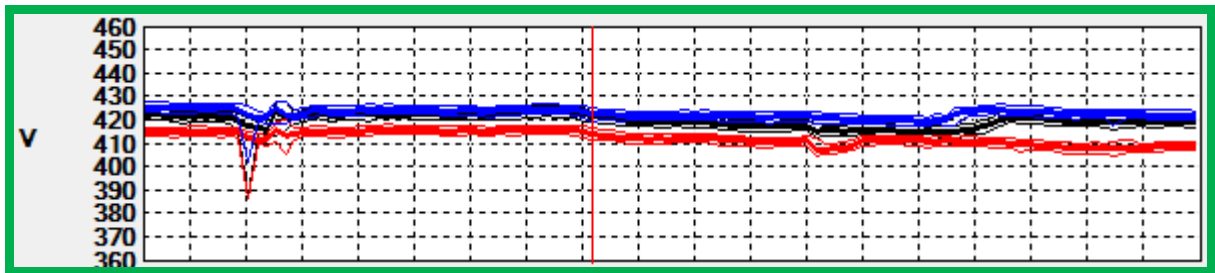


**B33-For-Sociology, English, Sewer Pumping Station, Physical Education (SS-B)**

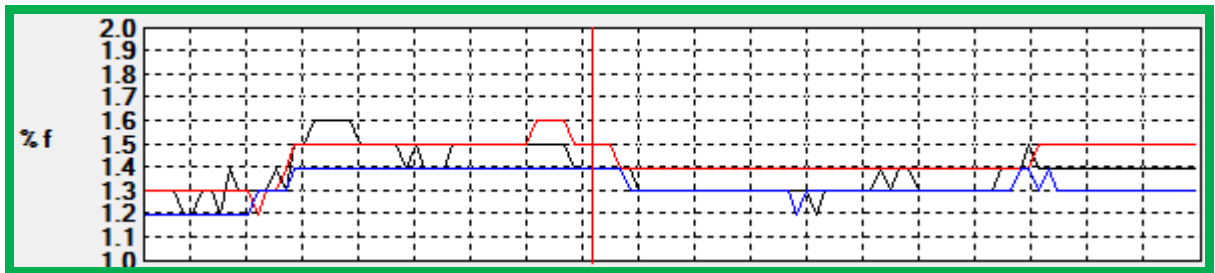
Frequency



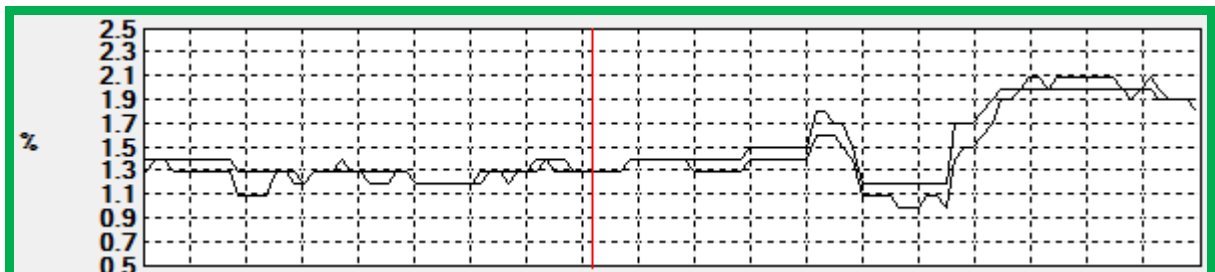
Voltage



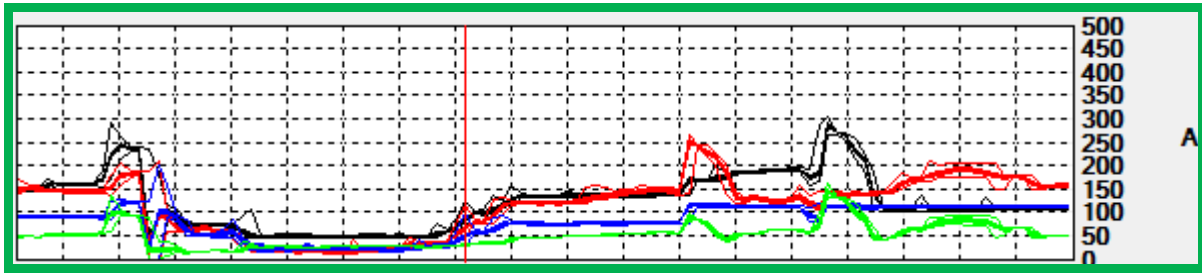
Voltage Harmonics



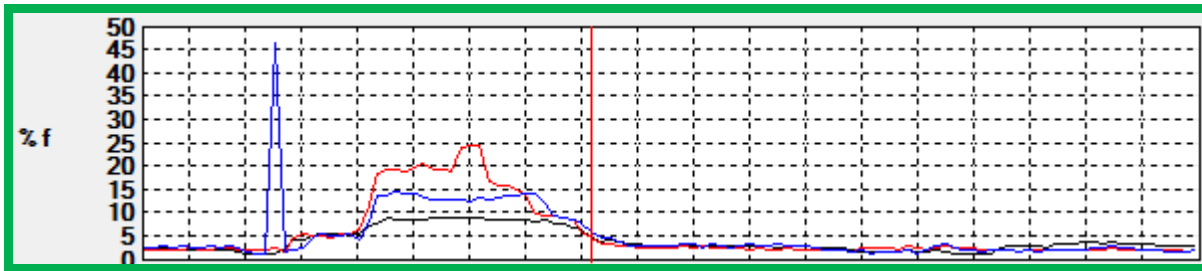
Voltage Un-balance



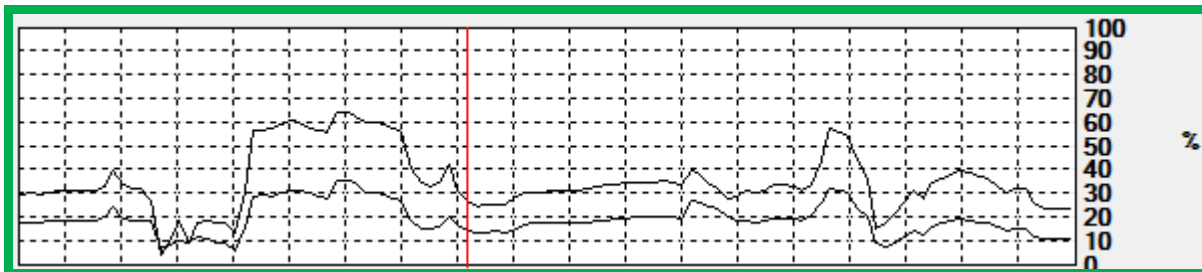
Current



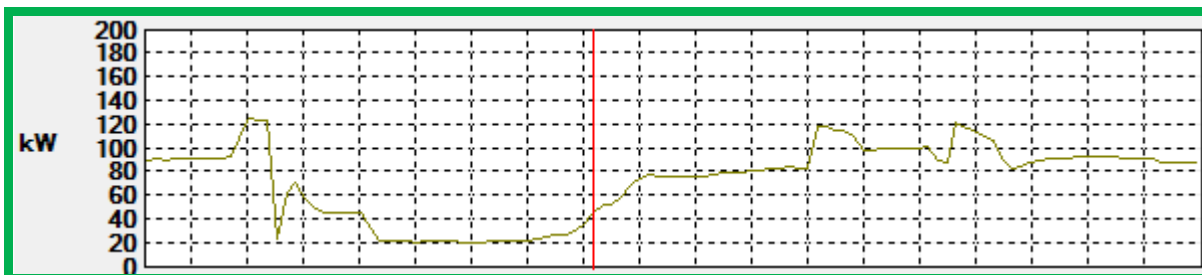
Current Harmonics



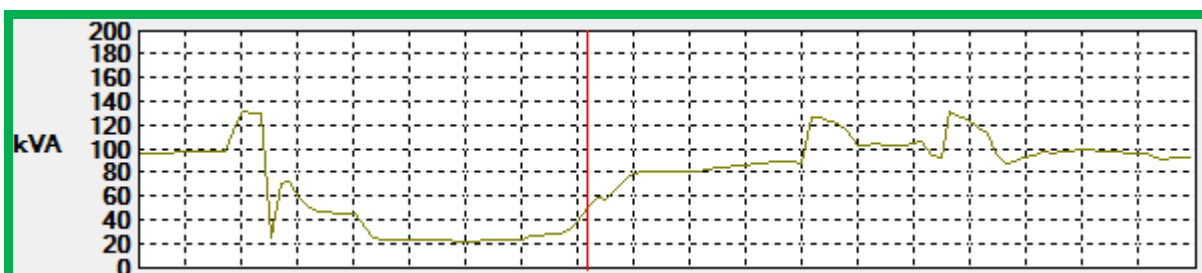
Current Un-balance



Power in KW



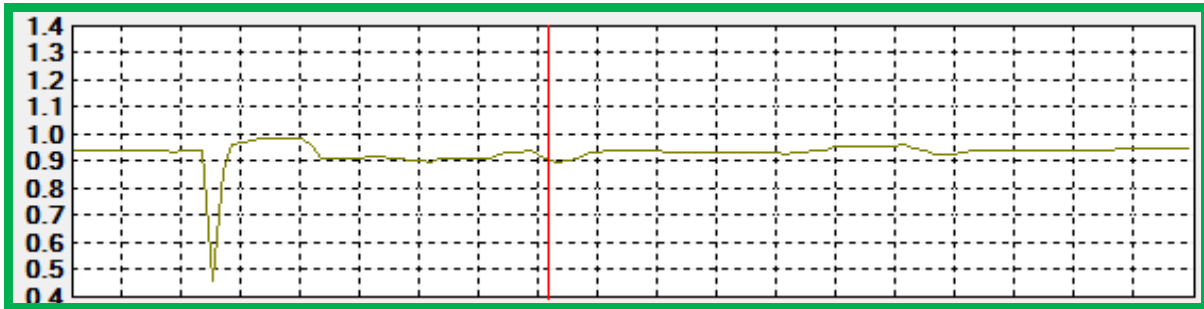
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	414.90	407.60	419.60	45.90	17.60	22.20	0.87	0.83	0.46	50.02	1.00	4.50
MAX	424.10	416.20	425.90	286.90	249.30	123.60	0.99	0.99	0.98	50.07	2.10	64.40
AVG	420.02	412.51	423.12	124.38	117.45	80.98	0.94	0.93	0.92	50.05	1.45	35.19

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.56	0.69	0.51	1.00	1.00	1.00	1.30	1.20	1.20	1.10	1.60	1.40
MAX	0.61	0.71	0.63	1.00	1.07	1.23	1.70	1.50	1.50	9.20	24.60	46.60
AVG	0.61	0.69	0.62	1.00	1.01	1.00	1.44	1.38	1.32	4.07	5.52	5.18



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



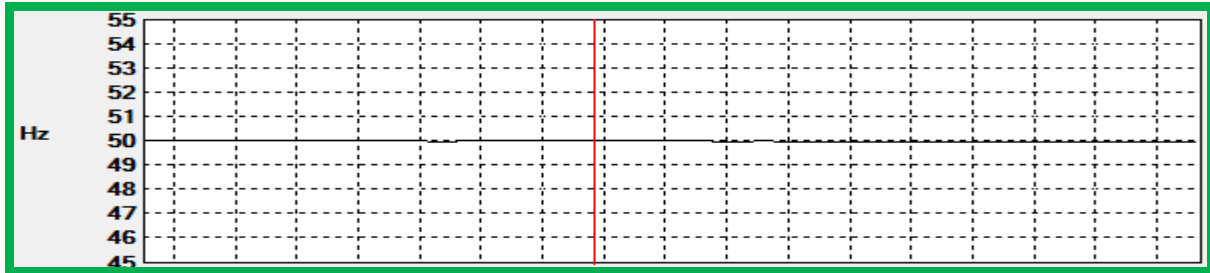
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.44	1.44	1.44	1.43	1.44	1.43
MAX	1.44	1.44	1.45	2.02	1.96	1.88
AVG	1.44	1.44	1.44	1.52	1.54	1.52

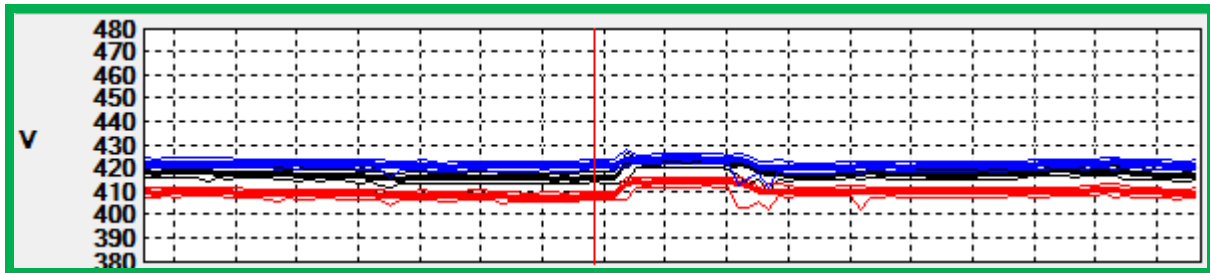


**B34-For-DSW, Sports and Sanskrit (SS-B)**

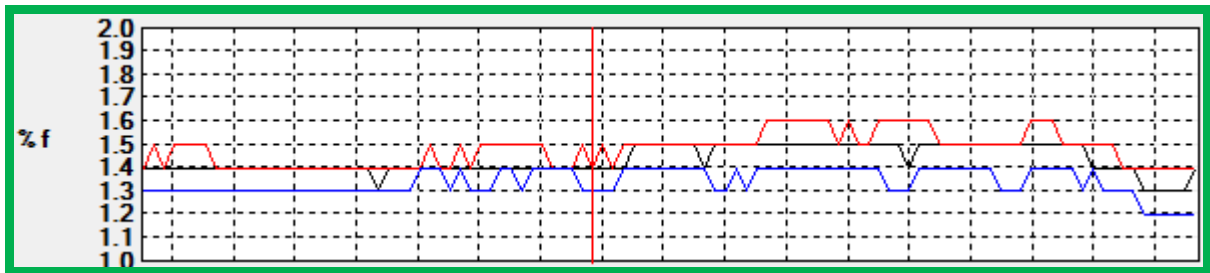
Frequency



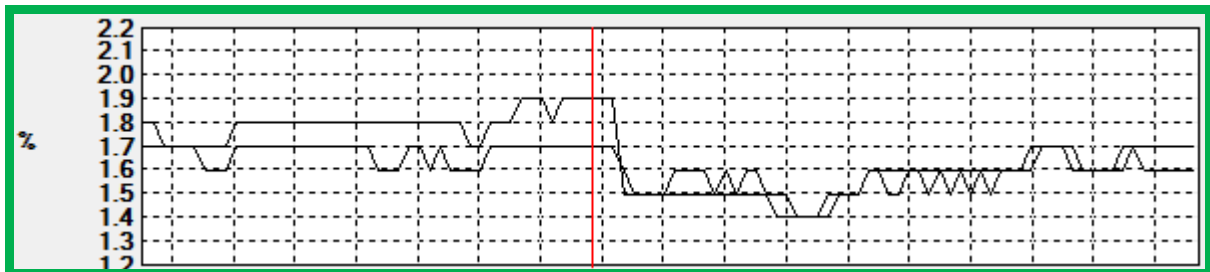
Voltage



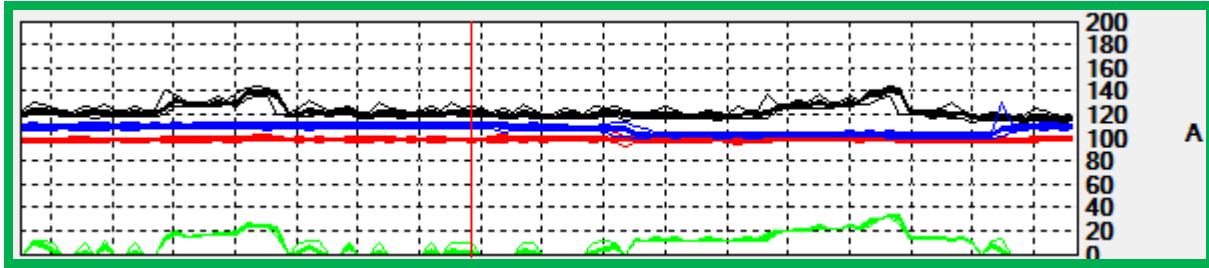
Voltage Harmonics



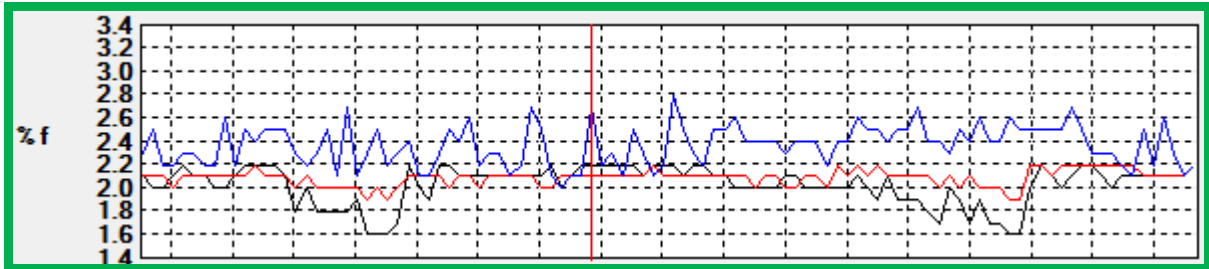
Voltage Un-balance



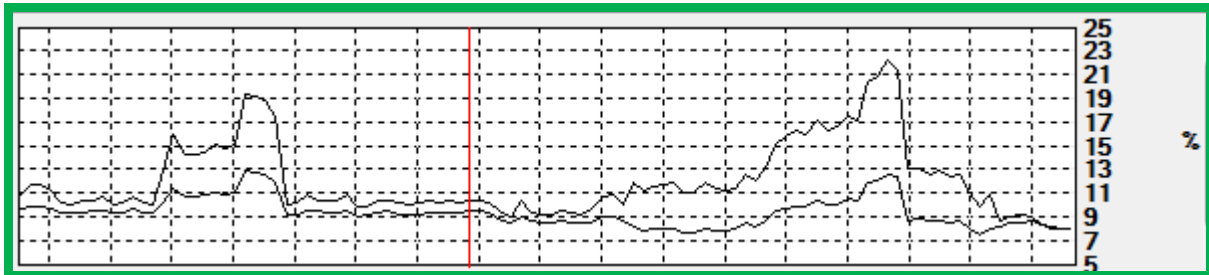
Current



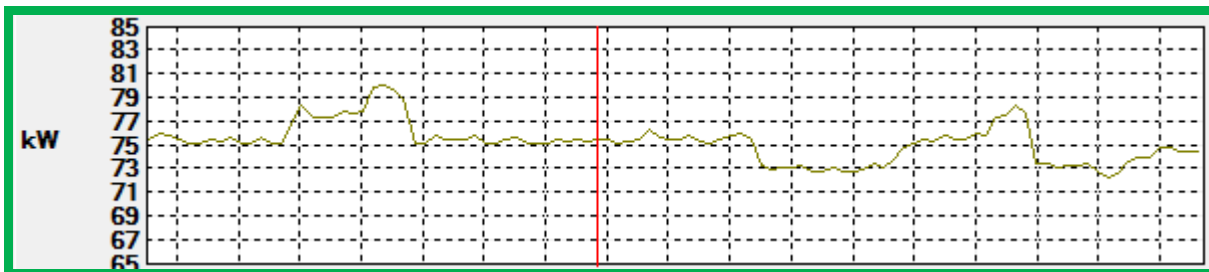
Current Harmonics



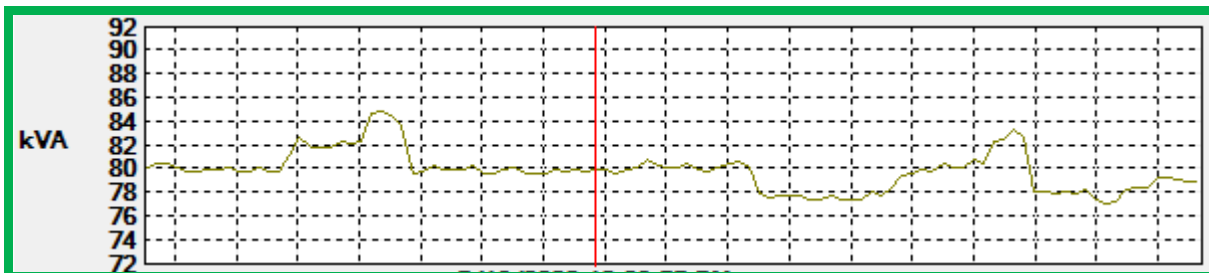
Current Un-balance



Power in KW



Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	415.70	407.70	420.10	117.00	98.50	103.00	0.93	0.93	0.95	49.97	1.40	8.10
MAX	423.00	414.30	424.60	141.10	101.50	111.30	0.94	0.94	0.96	50.04	1.80	22.30
AVG	418.10	410.02	421.88	123.79	99.54	108.13	0.94	0.93	0.96	50.01	1.59	12.13

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.53	0.55	0.51	1.00	1.00	1.00	1.40	1.30	1.20	1.60	1.90	2.00
MAX	0.56	0.71	0.60	1.00	1.00	1.00	1.60	1.50	1.50	2.20	2.20	2.80
AVG	0.55	0.68	0.53	1.00	1.00	1.00	1.50	1.39	1.37	2.03	2.09	2.37



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



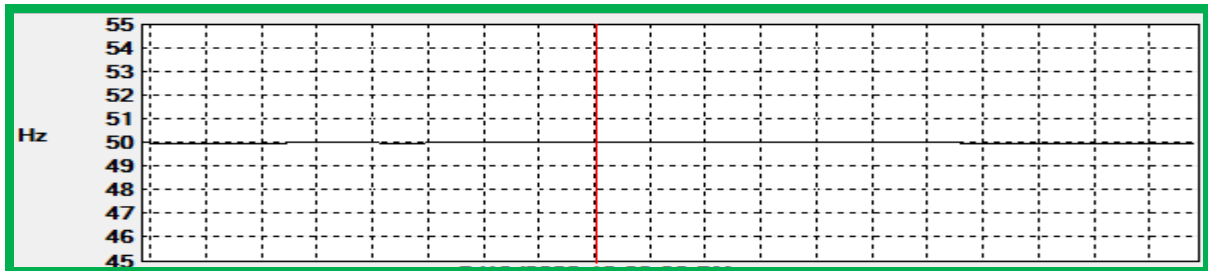
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.44	1.44	1.44	1.44	1.44	1.45
MAX	1.44	1.45	1.45	1.52	1.46	1.50
AVG	1.44	1.44	1.44	1.46	1.45	1.46

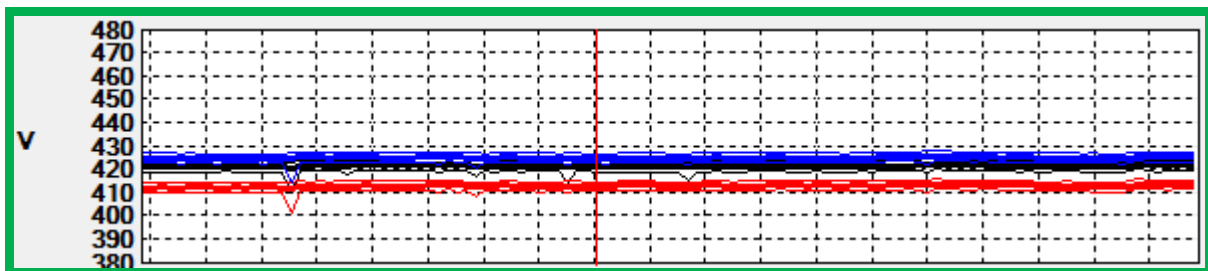


**B35-For-Physics, Chemistry, Microbiology Dept. (SS-B)**

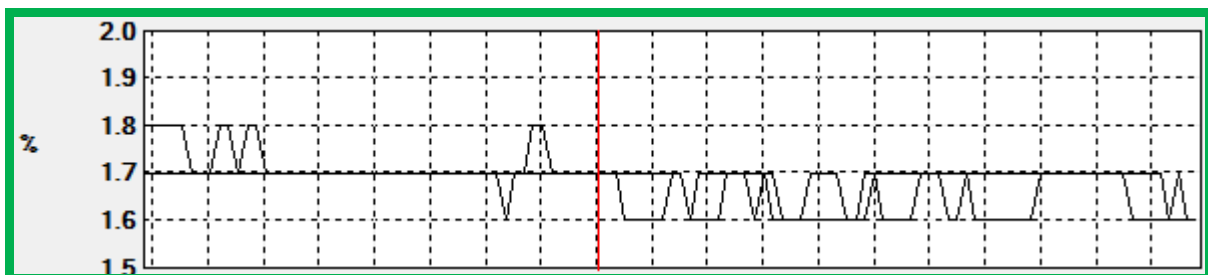
Frequency



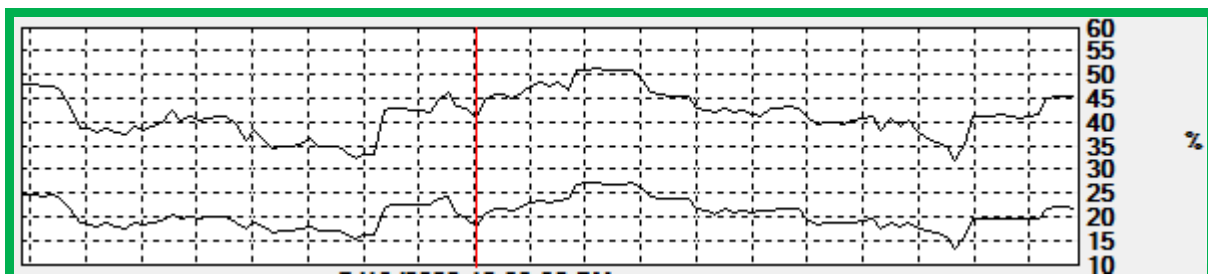
Voltage



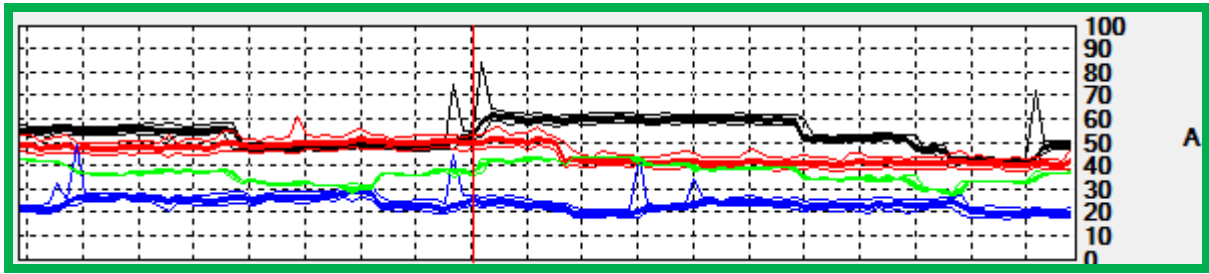
Voltage Harmonics



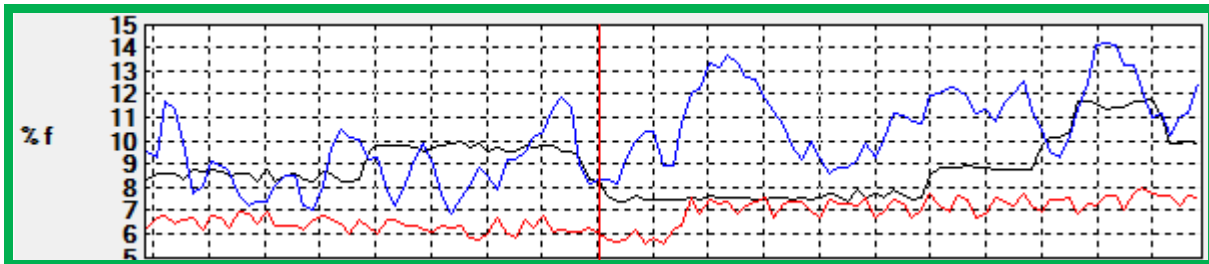
Voltage Un-balance



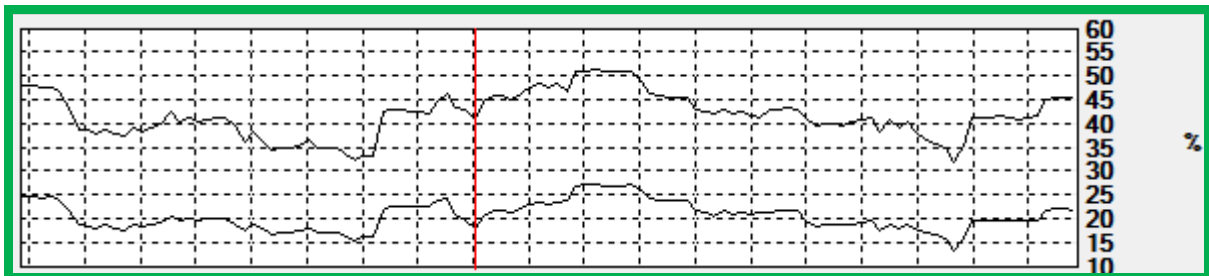
Current



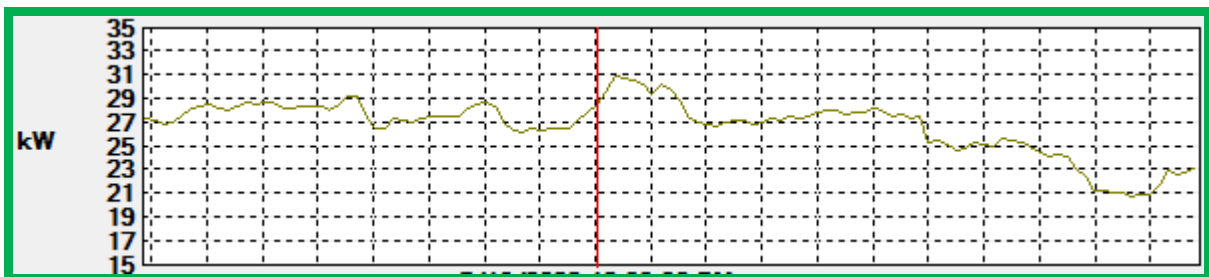
Current Harmonics



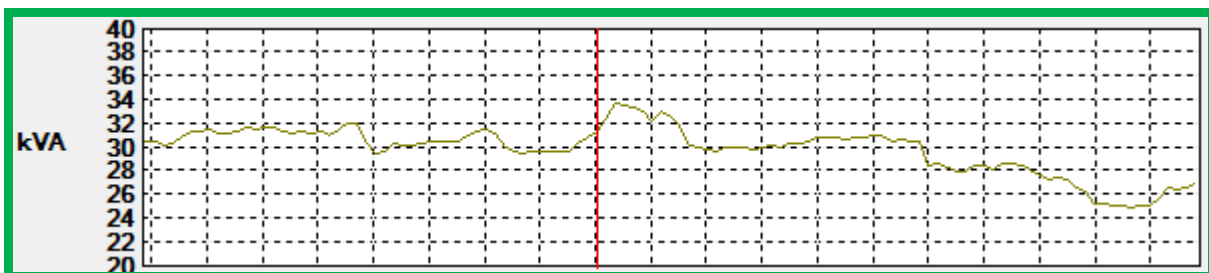
Current Un-balance



Power in KW



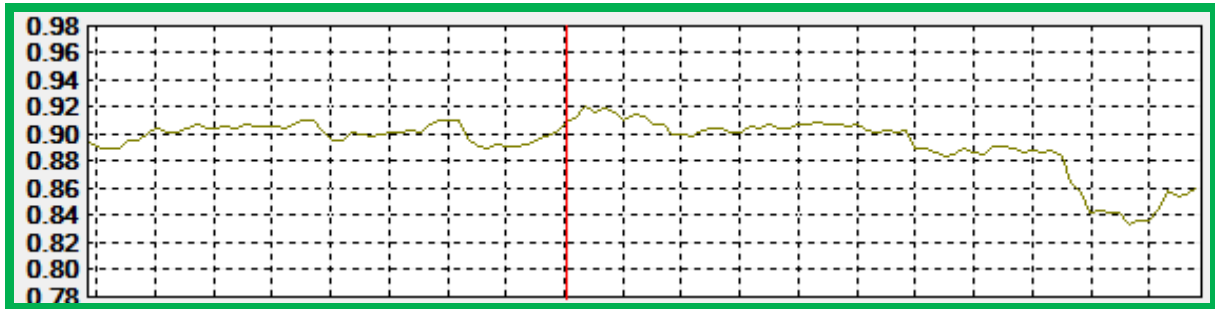
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	420.70	412.10	424.50	41.85	40.27	19.72	0.87	0.95	0.53	49.96	1.60	31.90
MAX	422.40	413.70	426.00	61.80	52.08	29.20	0.95	0.97	0.78	50.04	1.70	51.40
AVG	421.58	413.00	425.16	53.48	45.59	23.83	0.93	0.96	0.69	50.01	1.65	41.93

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	4.36	4.60	4.53	1.01	1.00	1.00	1.40	1.20	1.20	7.40	5.60	6.90
MAX	4.36	4.60	4.53	1.02	1.01	1.02	1.50	1.30	1.30	11.80	8.00	14.20
AVG	4.36	4.60	4.53	1.01	1.00	1.01	1.40	1.27	1.23	8.89	6.81	10.18



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



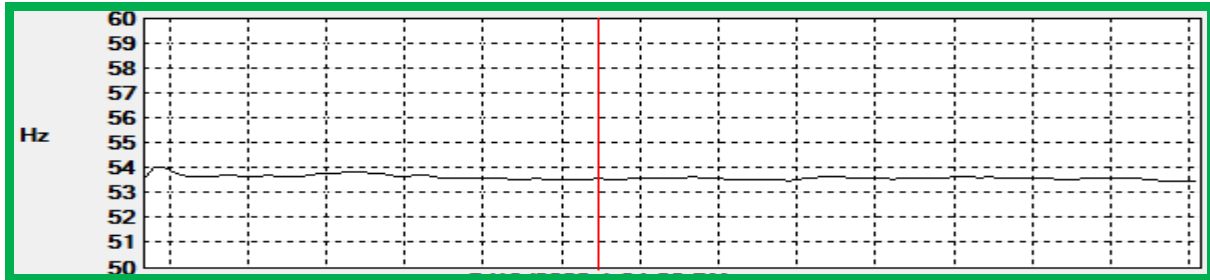
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.44	1.44	1.44	1.46	1.51	1.42
MAX	1.44	1.44	1.44	1.69	1.63	1.85
AVG	1.44	1.44	1.44	1.50	1.55	1.53

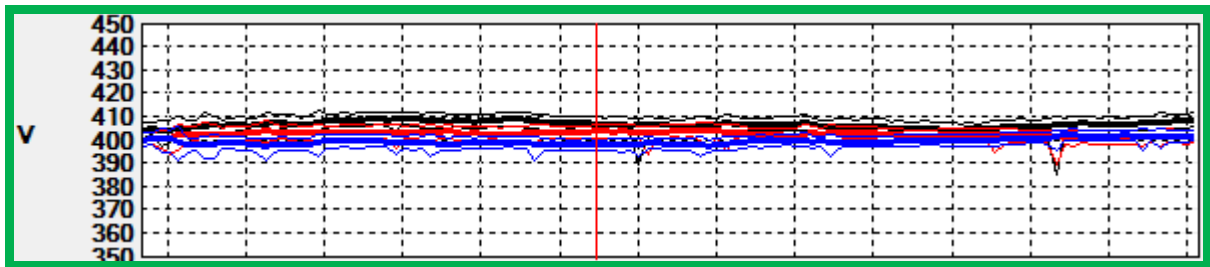


**B36-For-D.G. Set 180 KVA, (SS-B)**

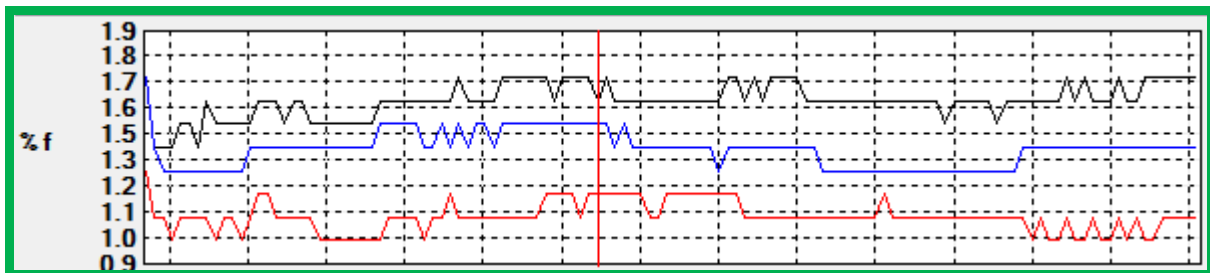
Frequency



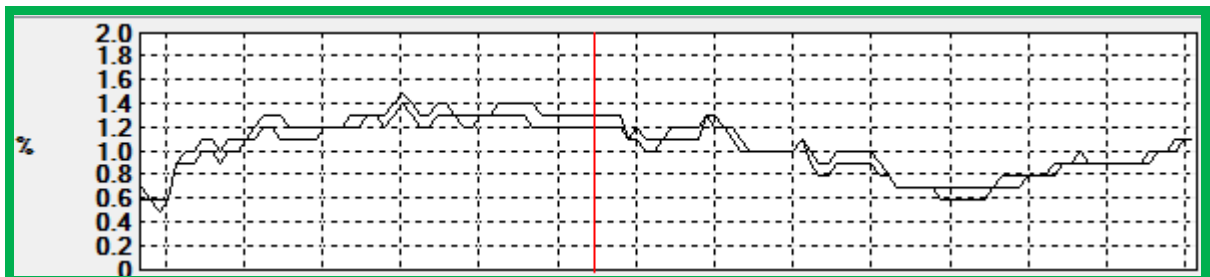
Voltage



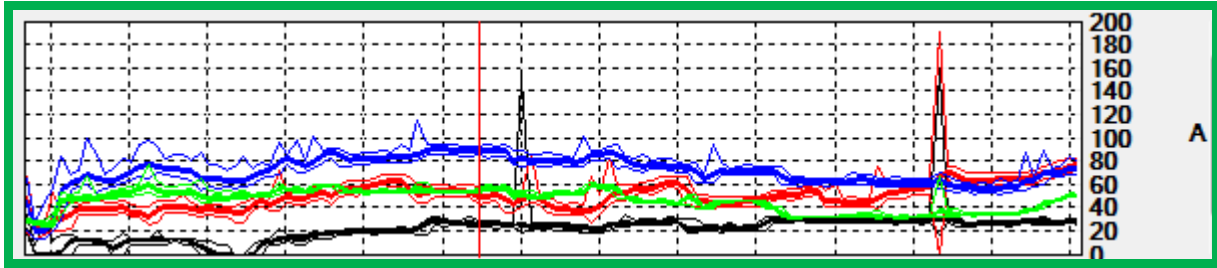
Voltage Harmonics



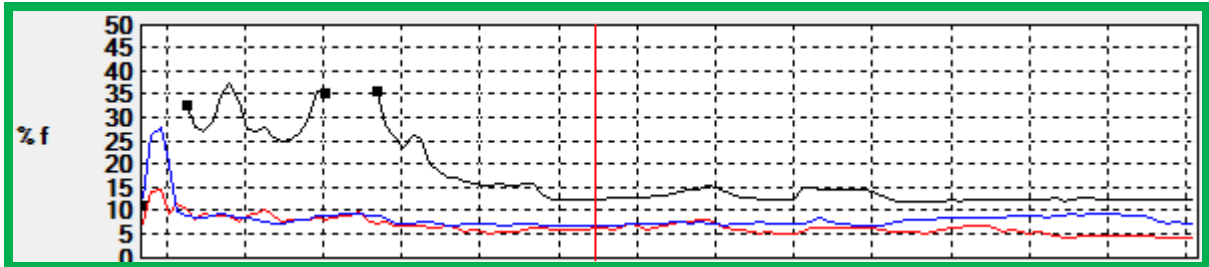
Voltage Un-balance



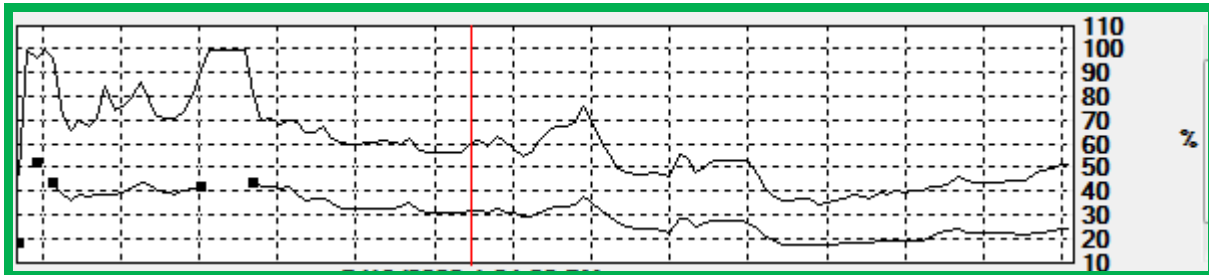
Current



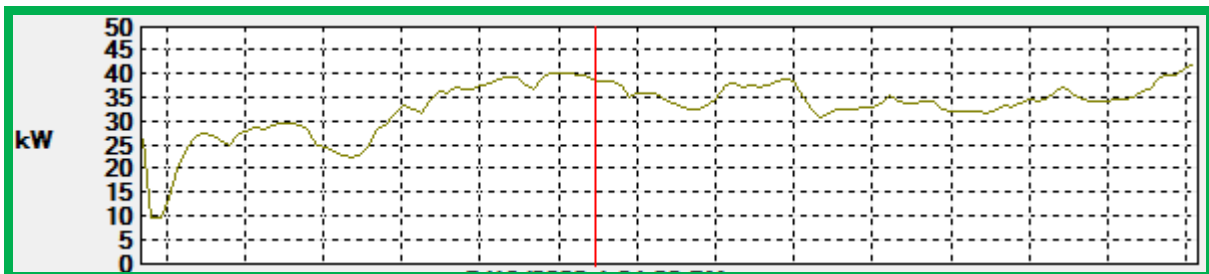
Current Harmonics



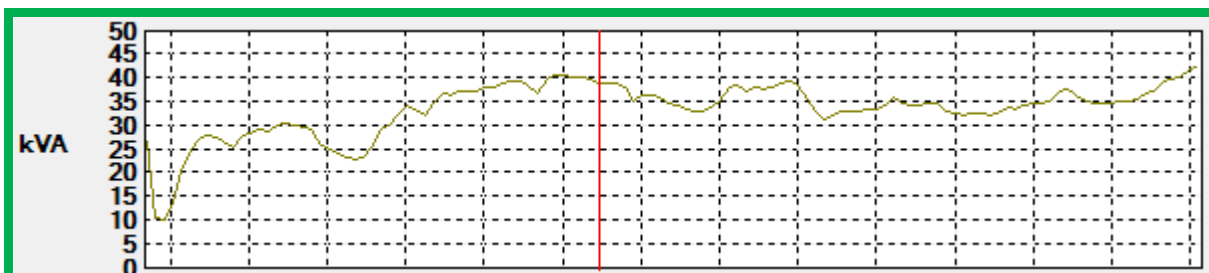
Current Un-balance



Power in KW

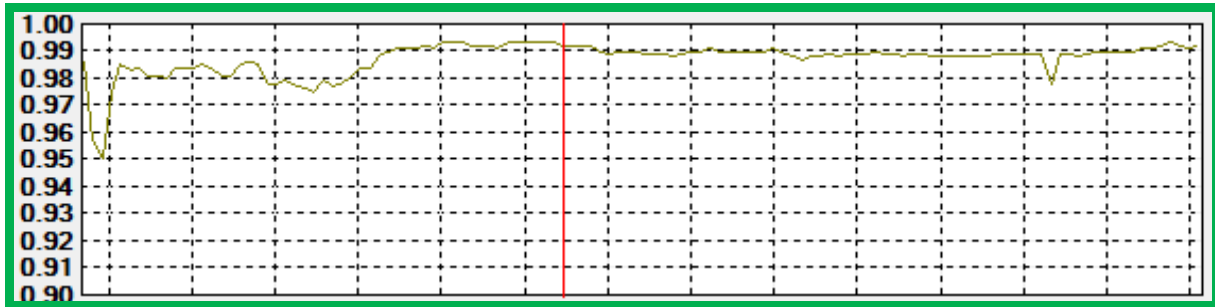


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	404.60	400.90	397.70	7.90	37.30	56.90	0.93	0.97	0.98	53.45	0.60	34.40
MAX	409.50	404.50	402.20	31.40	77.40	91.10	0.99	1.00	0.99	53.76	1.30	81.10
AVG	407.03	402.77	399.71	25.73	53.82	74.33	0.98	0.99	0.99	53.59	1.00	52.52

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.38	0.45	0.44	1.02	1.00	1.00	1.30	1.00	1.50	12.10	4.10	6.80
MAX	2.00	2.24	2.00	1.13	1.01	1.01	1.50	1.20	1.70	35.60	8.30	9.40
AVG	1.20	1.45	1.25	1.03	1.00	1.00	1.41	1.08	1.59	14.41	5.98	7.81



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.41	1.41	1.41	1.81	1.55	1.65
MAX	1.42	1.42	1.42	2.41	1.81	1.78
AVG	1.41	1.42	1.41	1.90	1.64	1.70

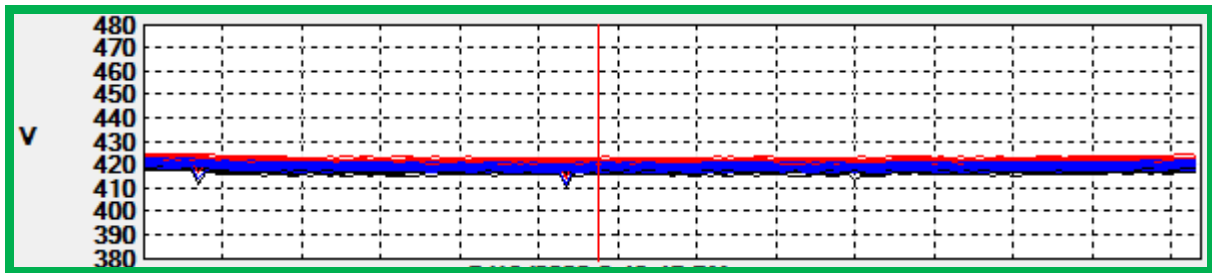


### B37-For-Lighting 1st Floor Kendriya Mulyankan Bhawan (SS-B)

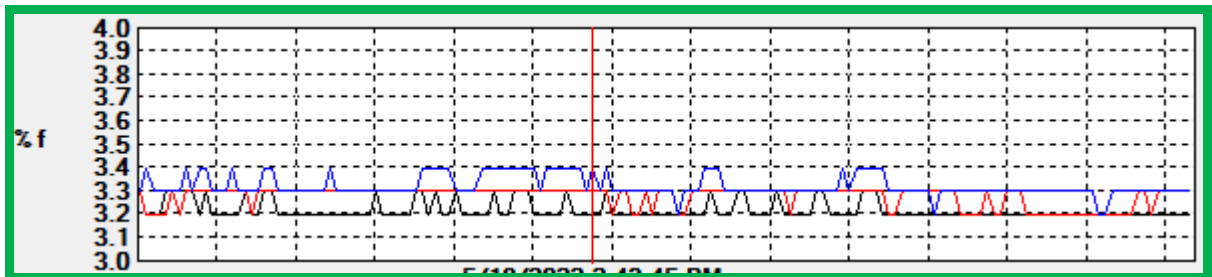
Frequency



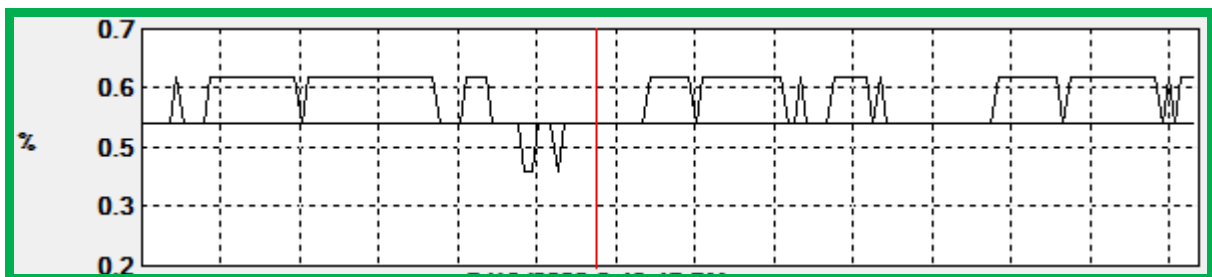
Voltage



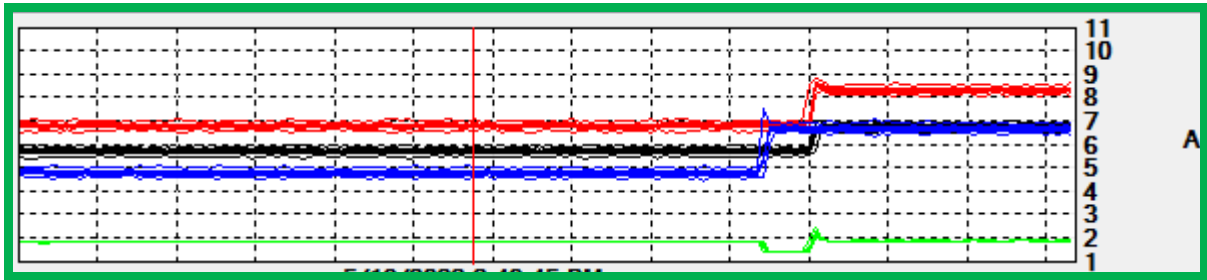
Voltage Harmonics



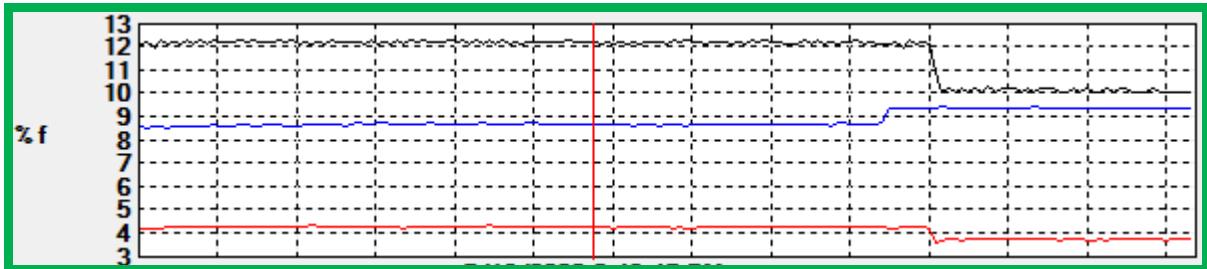
Voltage Un-balance



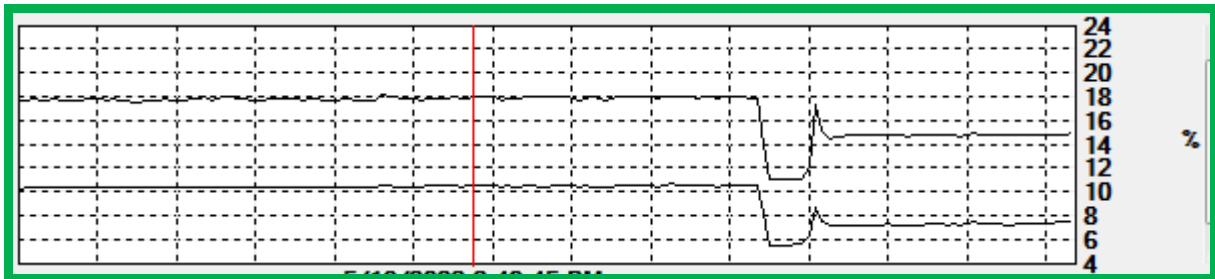
Current



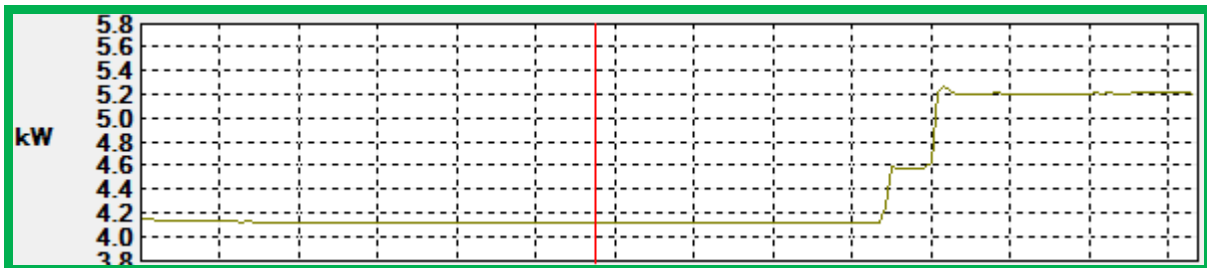
Current Harmonics



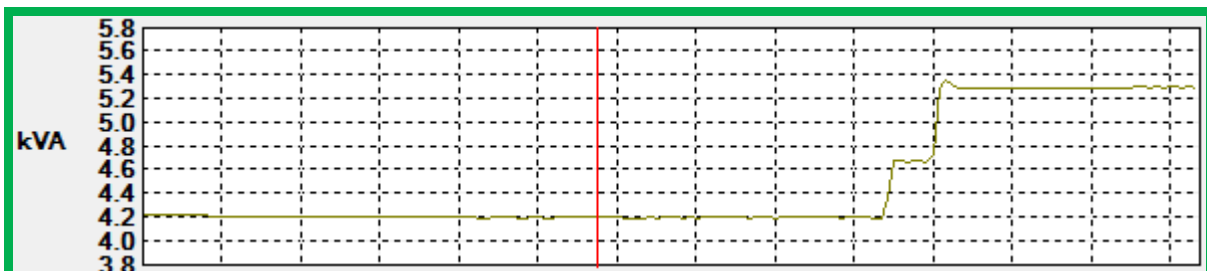
Current Un-balance



Power in KW



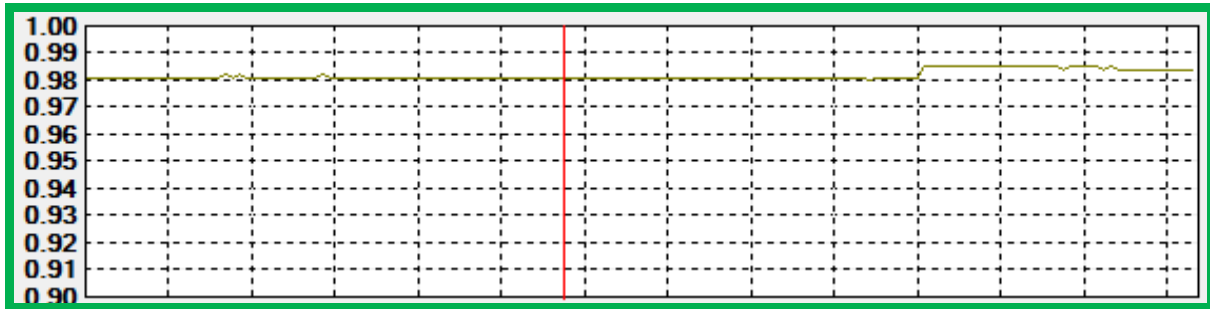
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	417.00	421.00	418.80	5.70	6.80	4.80	0.97	0.99	0.98	49.62	0.50	11.10
MAX	419.50	423.50	421.30	6.88	8.55	6.73	0.98	0.99	0.98	49.71	0.50	18.20
AVG	417.80	421.89	419.50	5.97	7.20	5.38	0.98	0.99	0.98	49.66	0.50	16.84

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.02	1.01	1.03	3.10	3.20	3.20	10.10	3.60	8.50
MAX	---	---	---	1.03	1.01	1.04	3.30	3.30	3.40	12.30	4.40	9.50
AVG	---	---	---	1.03	1.01	1.03	3.23	3.28	3.31	11.69	4.16	8.90



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



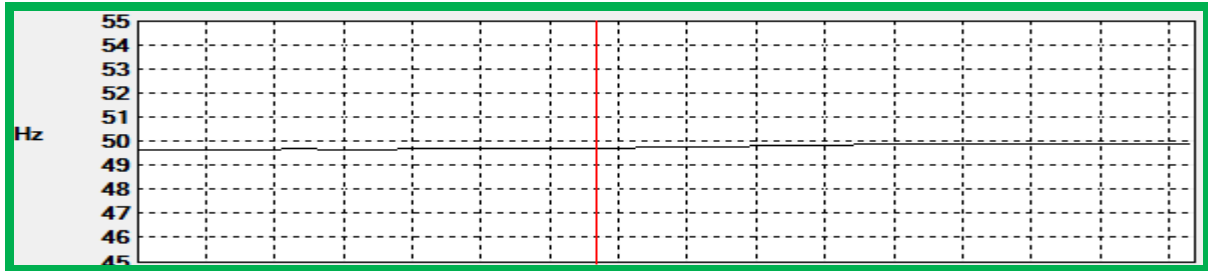
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.47	1.47	1.47	1.72	1.41	1.43
MAX	1.47	1.47	1.47	1.81	1.57	1.77
AVG	1.47	1.47	1.47	1.77	1.43	1.45

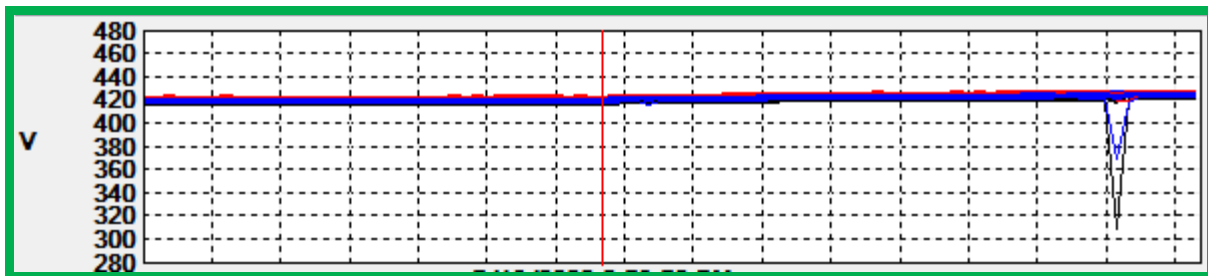


**B38-For-Lighting 3rd Floor Kendriya Mulyakan Bhawan (SS-B)**

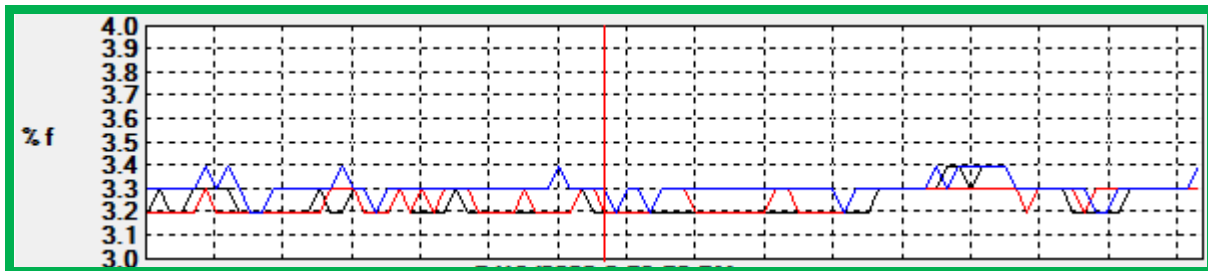
Frequency



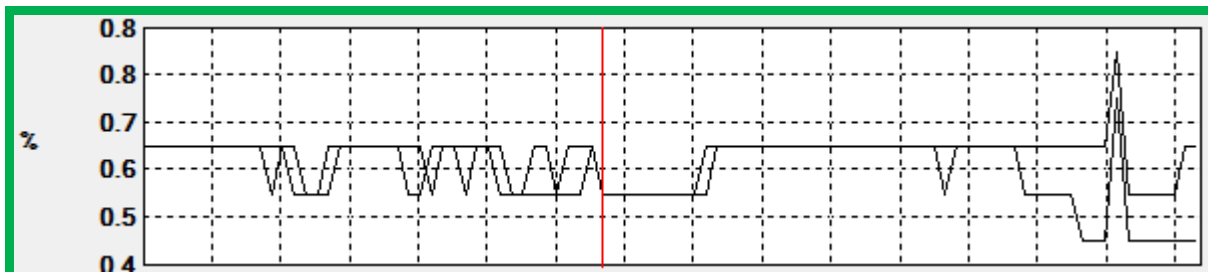
Voltage



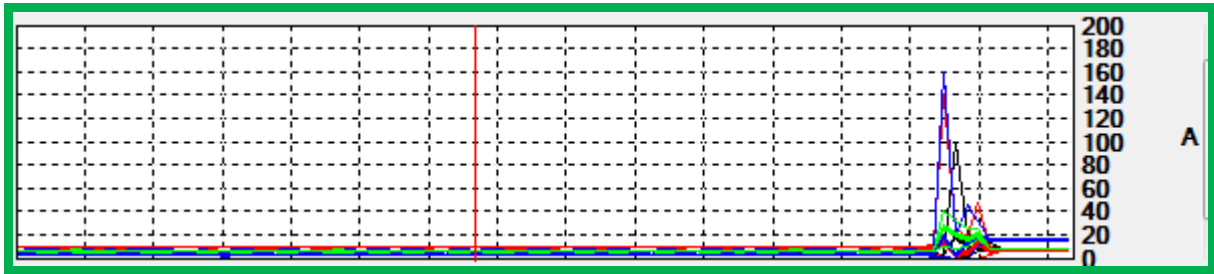
Voltage Harmonics



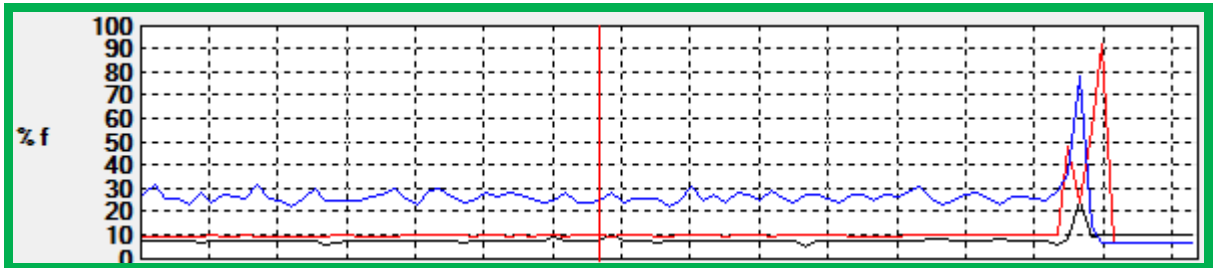
Voltage Un-balance



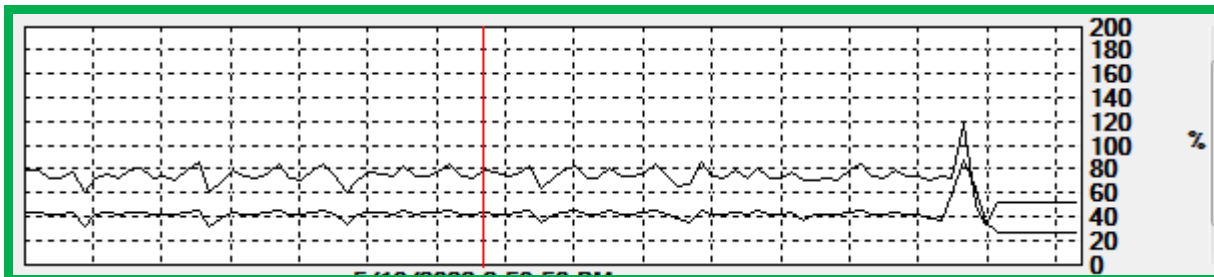
Current



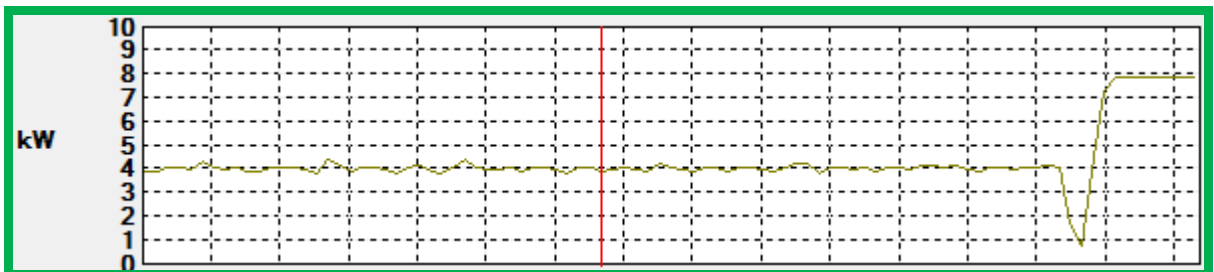
Current Harmonics



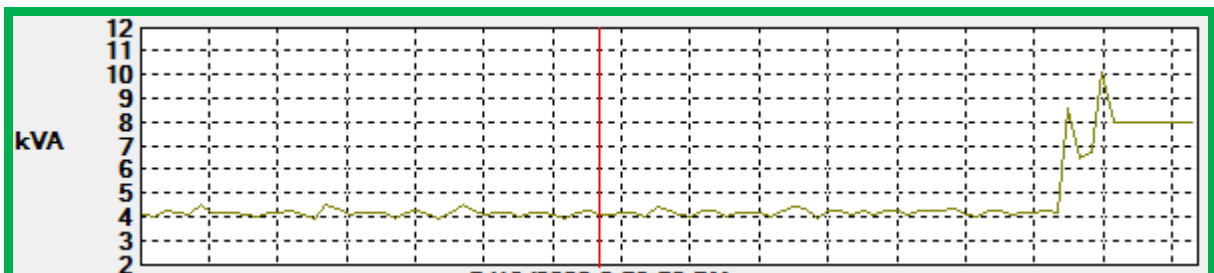
Current Un-balance



Power in KW



Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	417.60	421.80	419.40	3.08	3.28	3.01	0.22	0.04	0.09	49.65	0.50	34.10
MAX	423.10	427.10	424.60	19.51	14.02	18.73	0.99	0.99	0.98	49.92	0.80	119.20
AVG	419.59	423.84	421.49	4.11	9.77	5.38	0.94	0.95	0.90	49.79	0.51	73.25

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.02	1.01	1.02	3.20	3.10	3.20	5.60	6.60	7.00
MAX	---	---	---	1.10	1.39	1.39	3.50	3.30	3.40	25.00	92.20	78.50
AVG	---	---	---	1.03	1.02	1.13	3.25	3.23	3.32	8.38	11.64	25.11



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



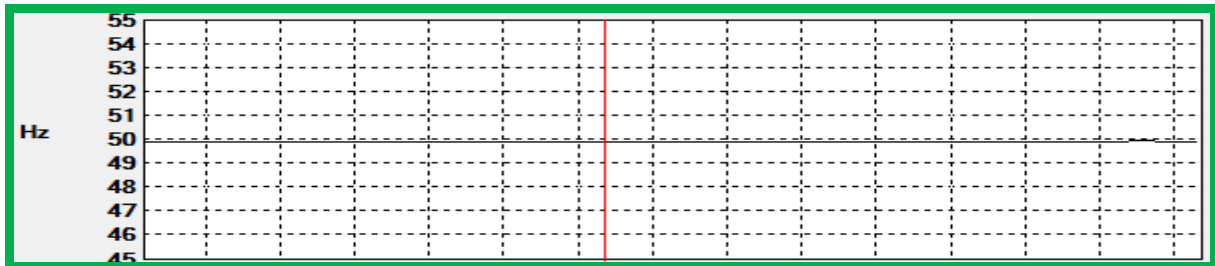
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.47	1.47	1.47	1.50	1.56	1.46
MAX	1.47	1.47	1.48	2.70	3.03	3.65
AVG	1.47	1.47	1.47	1.62	1.75	2.76

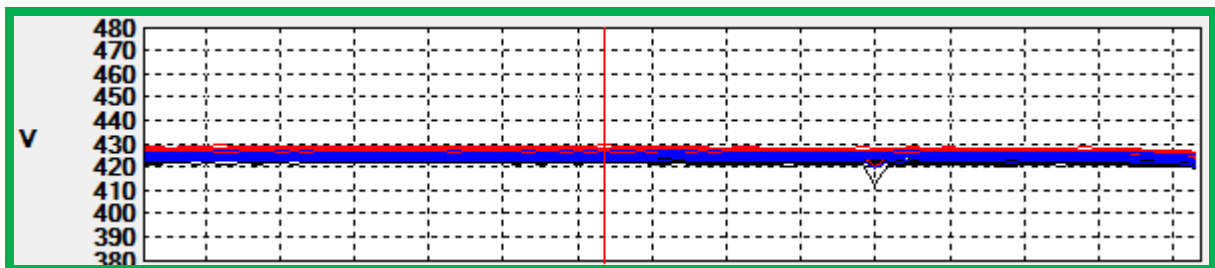


### B39-For-Lighting 2nd Floor Kendriya Mulyakan Bhawan (SS-B)

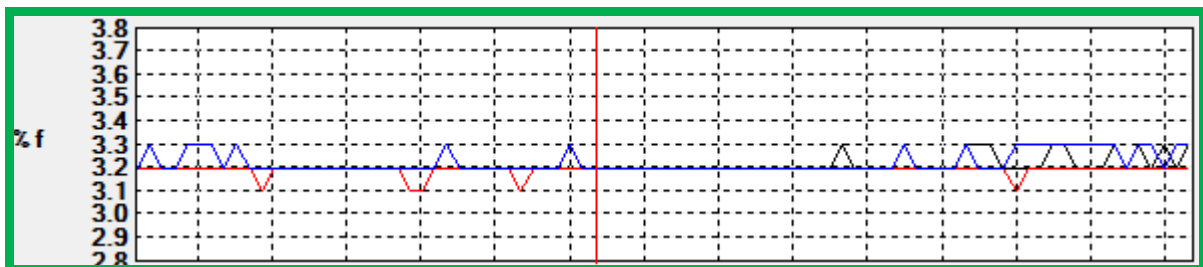
Frequency



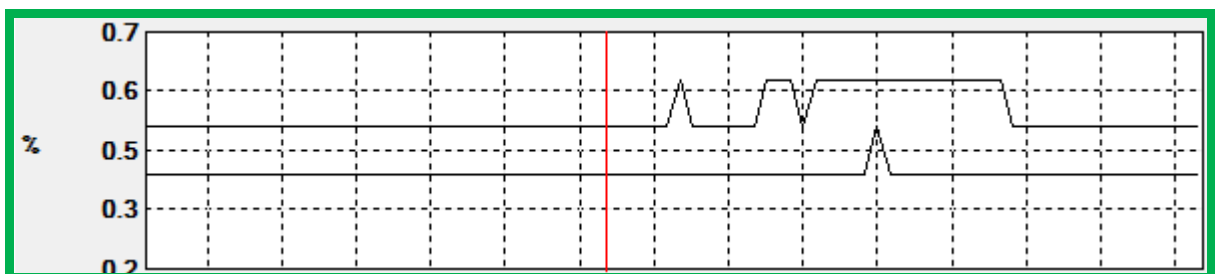
Voltage



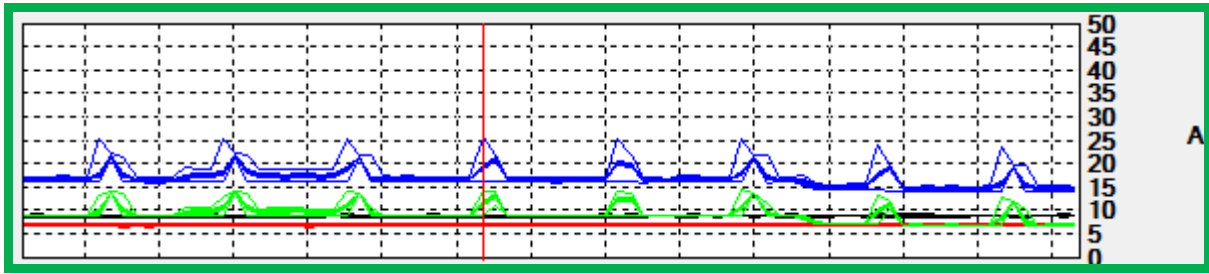
Voltage Harmonics



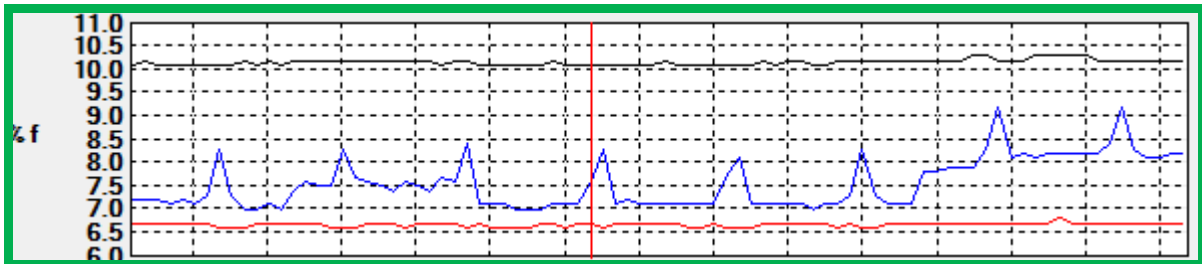
Voltage Un-balance



Current



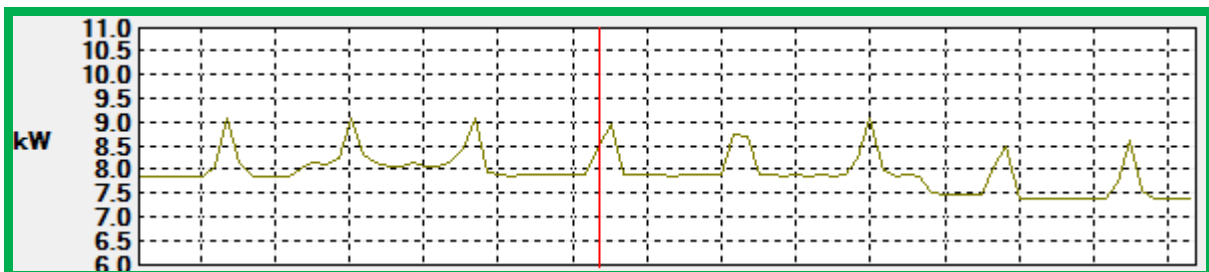
Current Harmonics



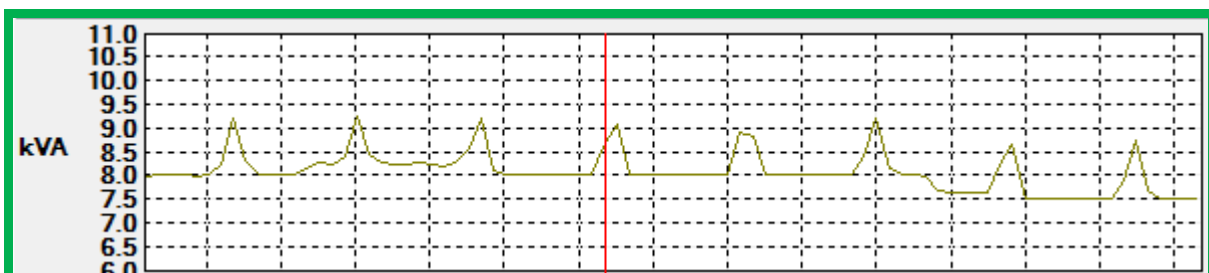
Current Un-balance



Power in KW



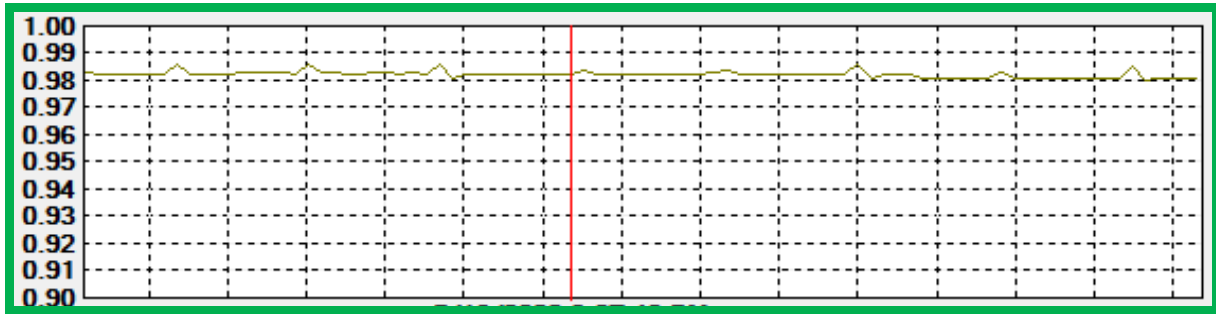
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	421.70	425.30	422.60	8.97	7.01	14.66	0.98	0.99	0.98	49.89	0.40	43.20
MAX	423.80	427.60	425.30	9.05	7.04	21.58	0.98	0.99	0.99	49.94	0.50	72.20
AVG	423.09	427.05	424.83	9.01	7.03	16.94	0.98	0.99	0.98	49.91	0.49	53.75

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.04	1.02	1.02	3.20	3.20	3.20	10.10	6.60	7.00
MAX	---	---	---	1.05	1.03	1.04	3.30	3.20	3.40	10.30	6.80	9.20
AVG	---	---	---	1.05	1.03	1.03	3.21	3.20	3.29	10.17	6.68	7.55



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



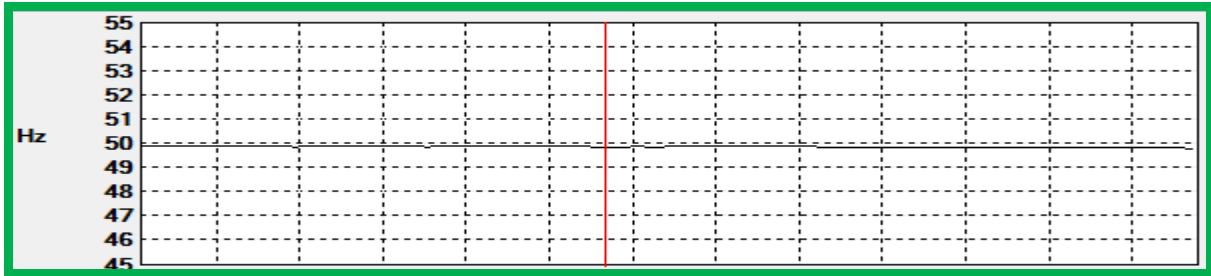
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.47	1.47	1.47	1.65	1.55	1.46
MAX	1.47	1.47	1.47	1.67	1.57	1.62
AVG	1.47	1.47	1.47	1.66	1.56	1.50

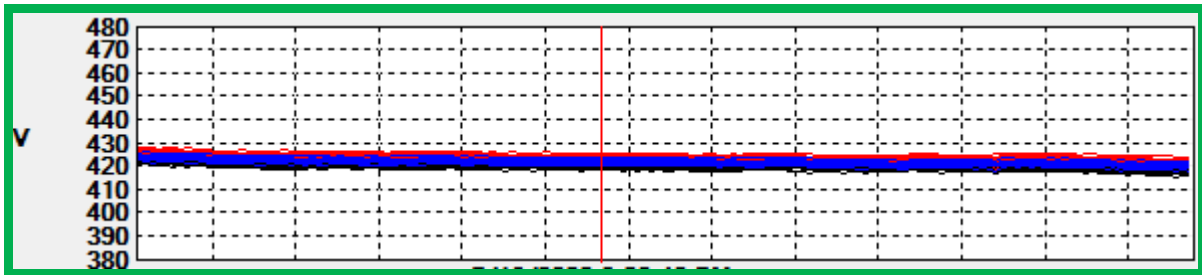


### B40-For-AC Feeder Kendriya Mulyakan Bhawan (SS-B)

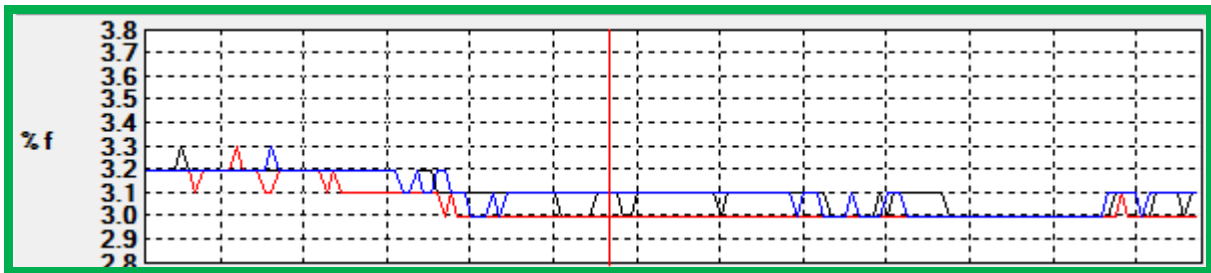
Frequency



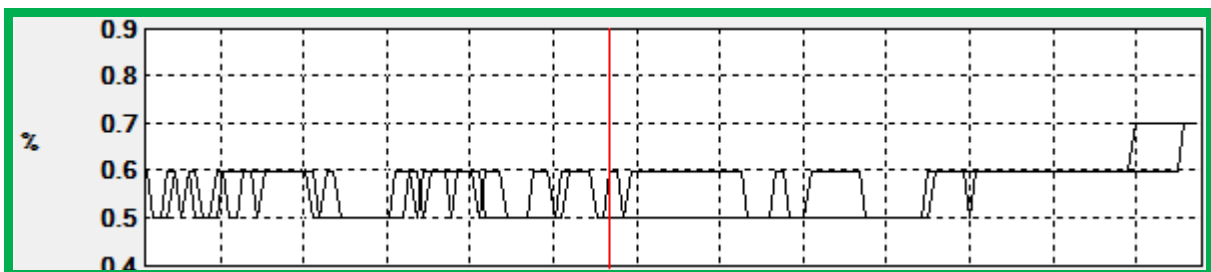
Voltage



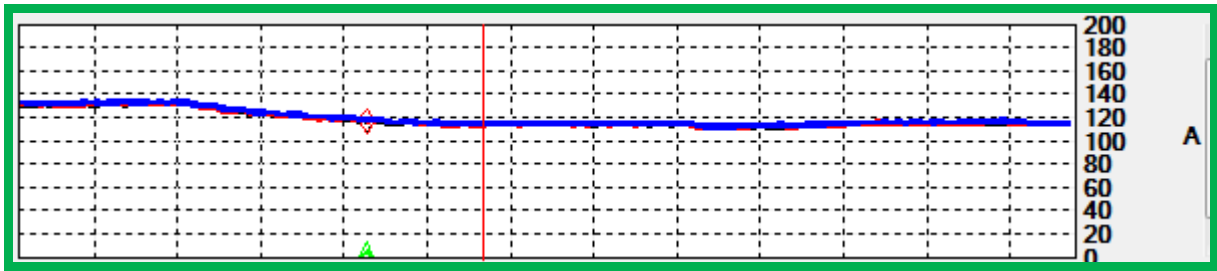
Voltage Harmonics



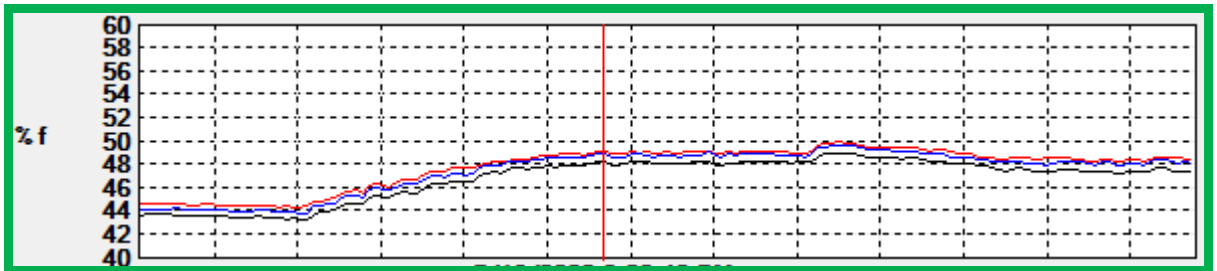
Voltage Un-balance



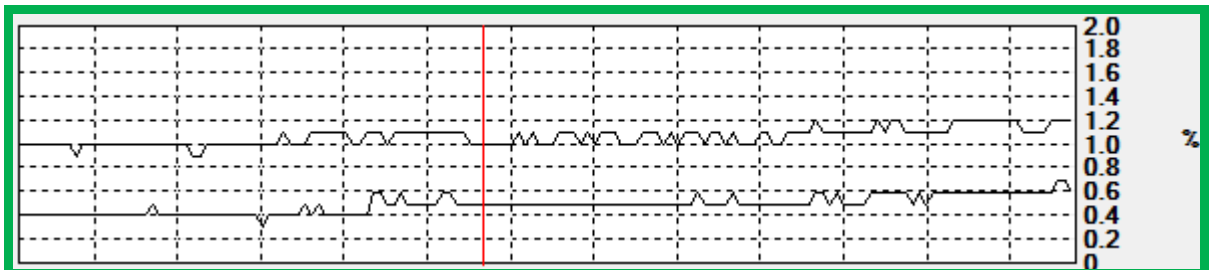
Current



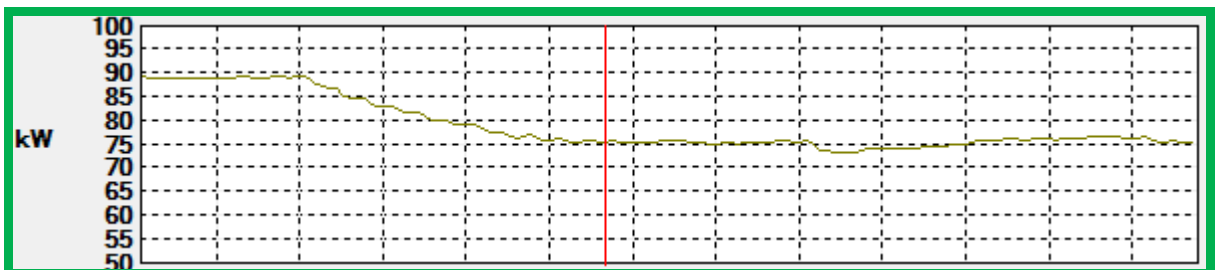
Current Harmonics



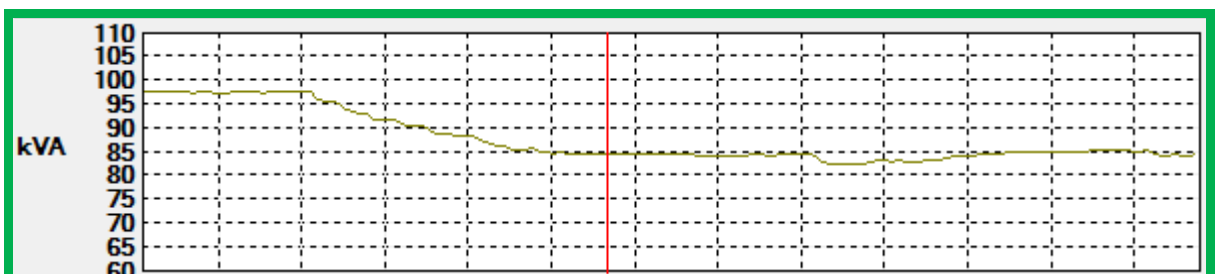
Current Un-balance



Power in KW

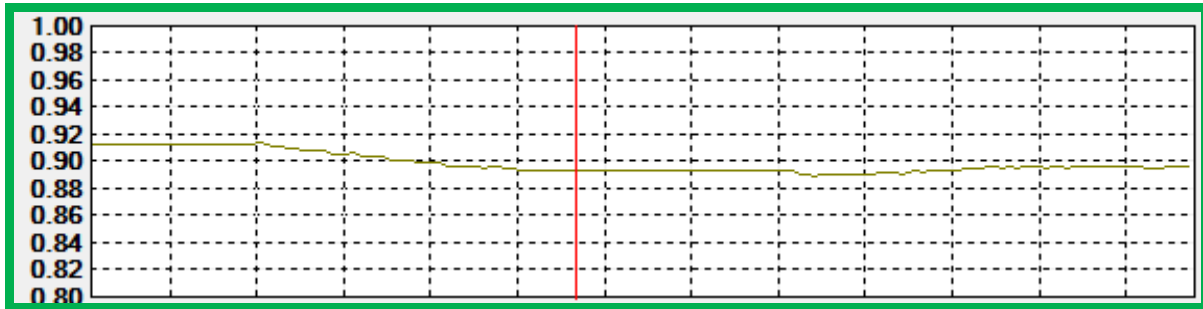


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	417.60	422.40	420.20	112.30	112.50	113.30	0.89	0.89	0.89	49.81	0.40	0.30
MAX	422.50	426.60	424.30	133.10	133.30	134.10	0.92	0.91	0.91	49.93	0.60	0.70
AVG	419.96	424.07	422.04	119.56	119.68	120.52	0.90	0.90	0.90	49.87	0.50	0.49

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.50	1.23	1.00	1.21	1.21	1.21	3.00	2.90	3.00	43.30	44.30	43.80
MAX	1.74	1.74	1.50	1.24	1.25	1.24	3.20	3.30	3.30	49.00	50.00	49.70
AVG	1.68	1.36	1.13	1.23	1.24	1.23	3.06	3.04	3.13	46.85	47.80	47.48



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.47	1.47	1.47	1.95	1.97	1.97
MAX	1.47	1.47	1.47	2.06	2.07	2.11
AVG	1.47	1.47	1.47	2.02	2.04	2.06

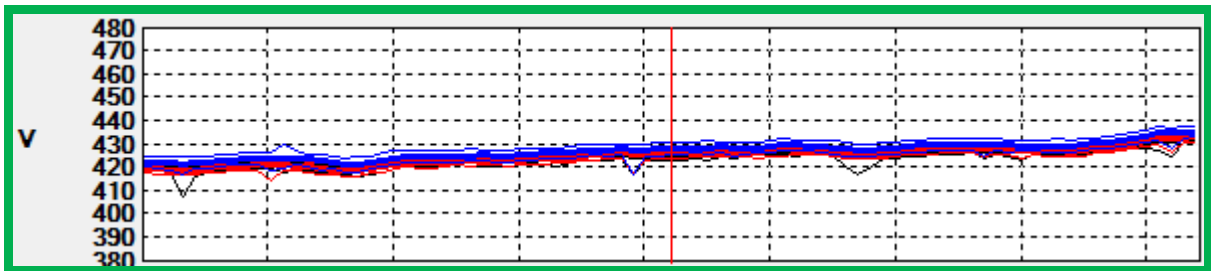


### A4-For- Transformer Output -630 KVA (SS-C)

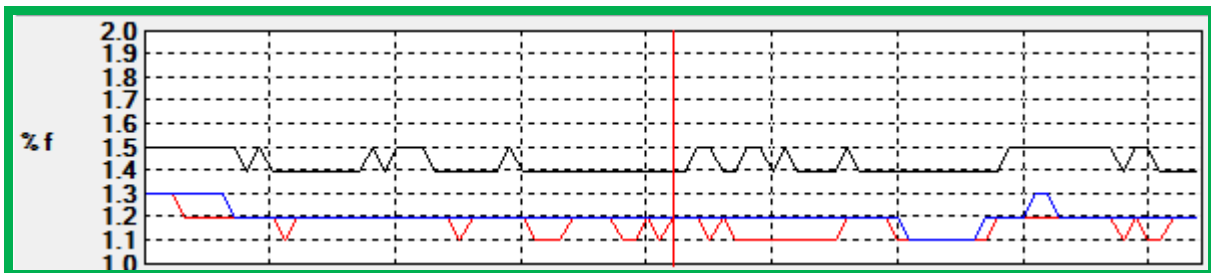
Frequency



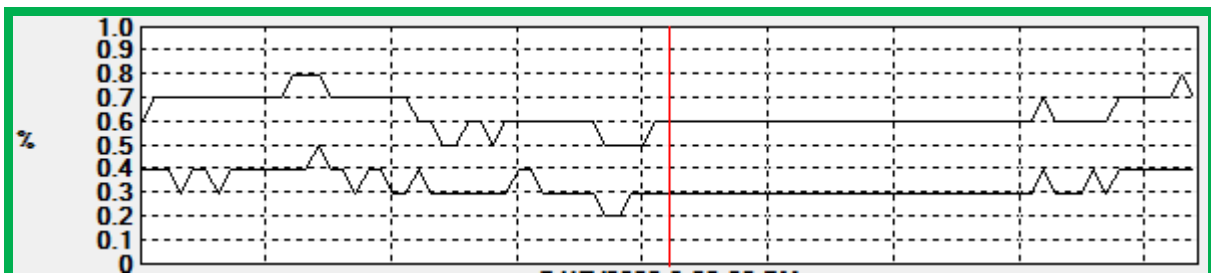
Voltage



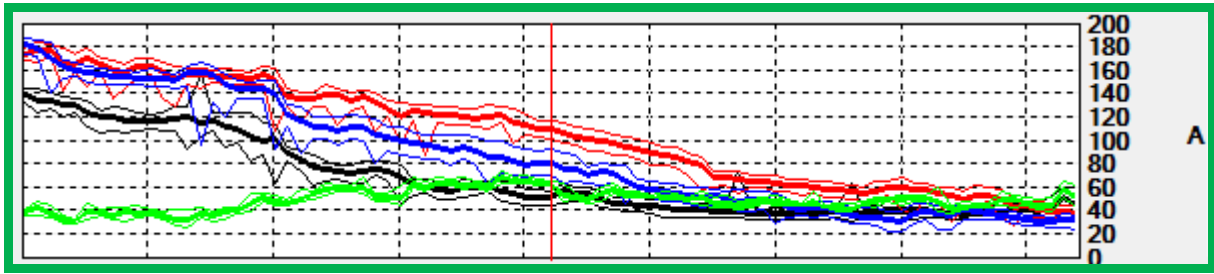
Voltage Harmonics



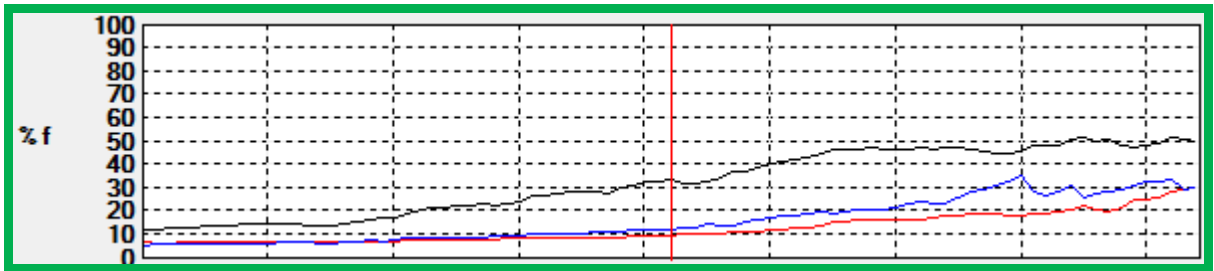
Voltage Un-balance



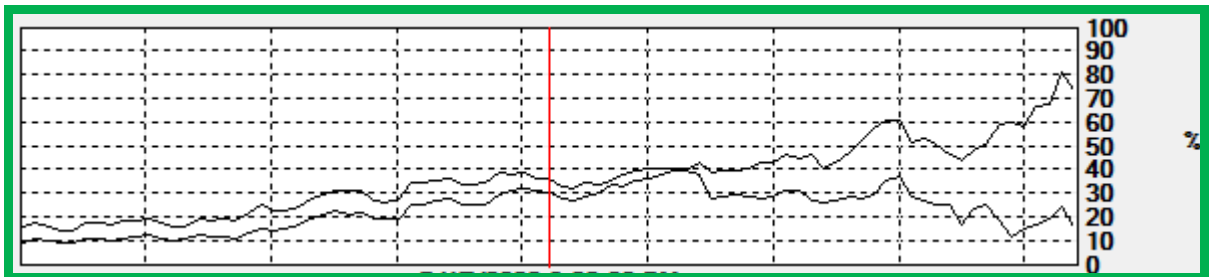
Current



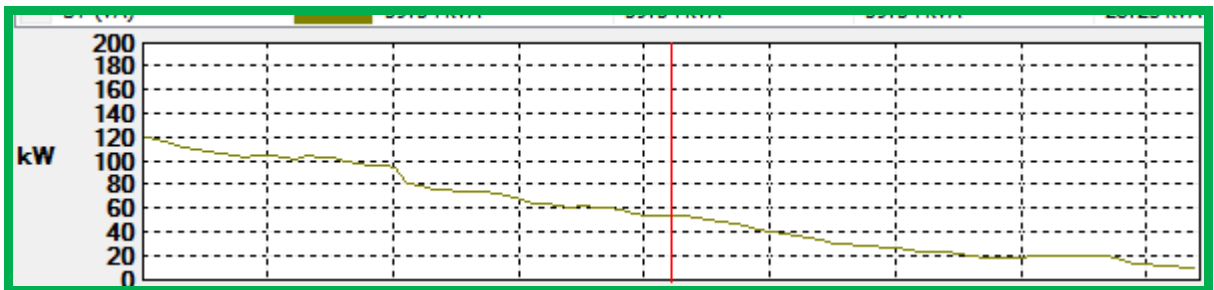
Current Harmonics



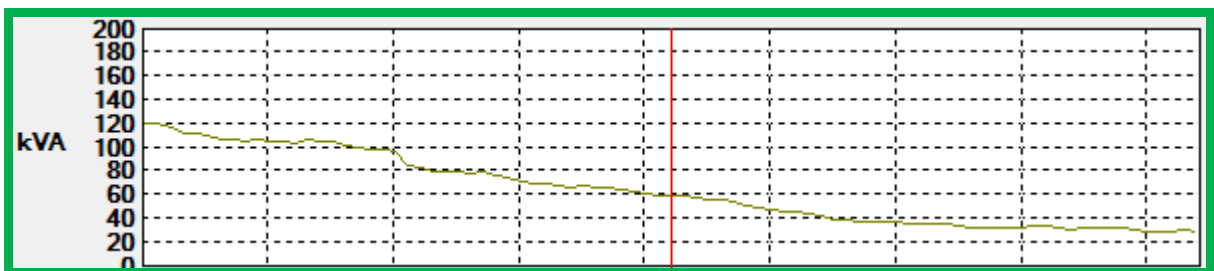
Current Un-balance



Power in KW



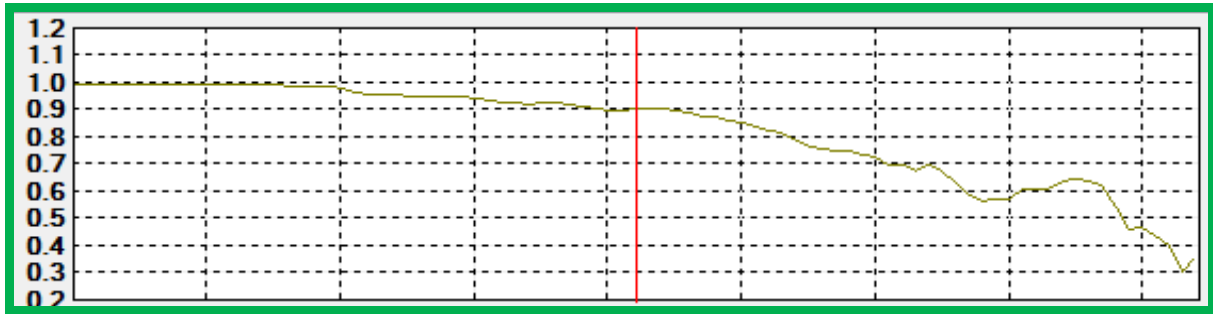
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	419.40	418.70	421.70	37.00	38.30	30.30	0.46	0.84	0.72	49.91	0.30	12.10
MAX	432.40	433.10	435.50	139.00	177.80	182.20	0.99	0.99	1.00	50.08	0.50	40.90
AVG	424.88	425.03	427.28	67.26	105.40	87.22	0.51	0.96	0.93	49.99	0.37	27.28

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.20	0.19	0.18	1.01	1.00	1.00	1.30	1.00	1.30	12.00	6.40	5.60
MAX	1.58	1.66	1.66	1.15	1.10	1.12	1.50	1.20	1.40	52.00	30.40	35.10
AVG	0.48	0.59	0.63	1.08	1.02	1.04	1.38	1.09	1.35	32.55	12.60	16.10



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



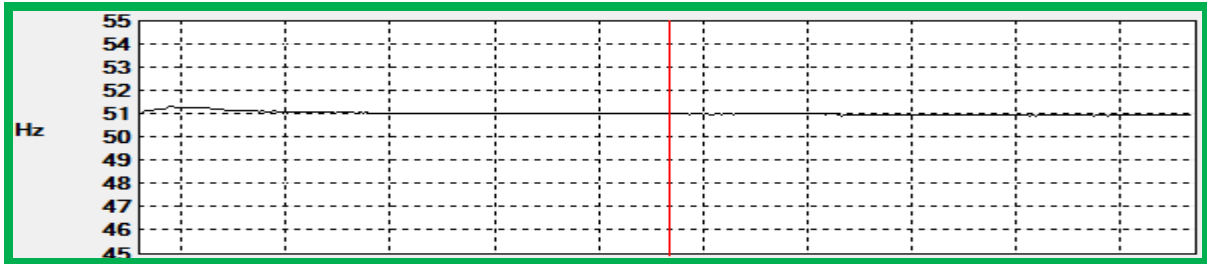
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.57	1.52	1.46
MAX	1.44	1.43	1.43	2.45	1.81	1.88
AVG	1.43	1.43	1.43	1.86	1.61	1.63

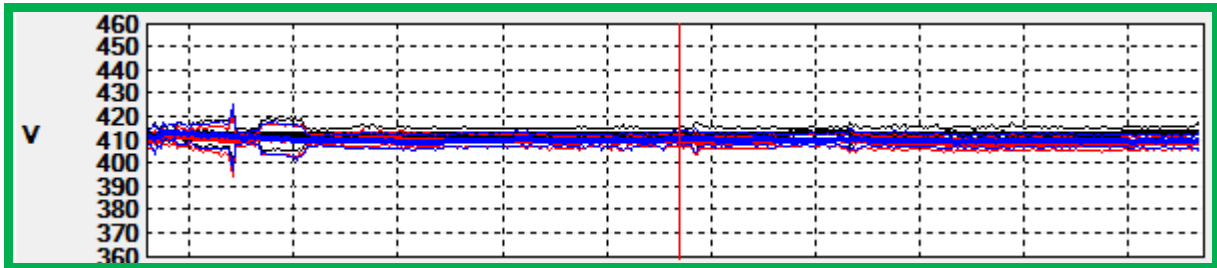


**A11-For-D. G Set 380 KVA (SS-C)**

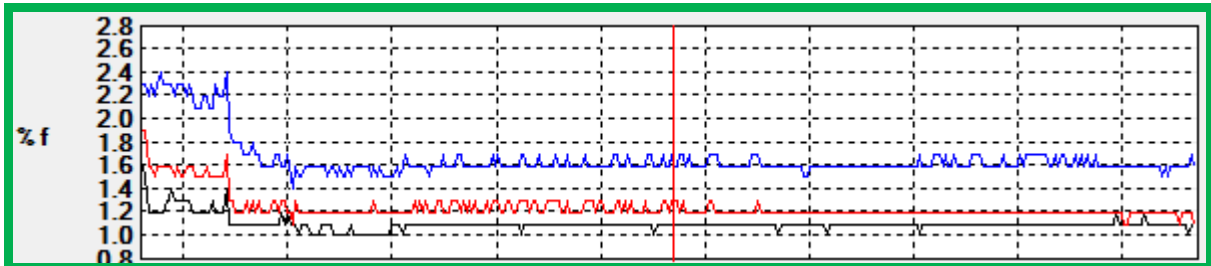
Frequency



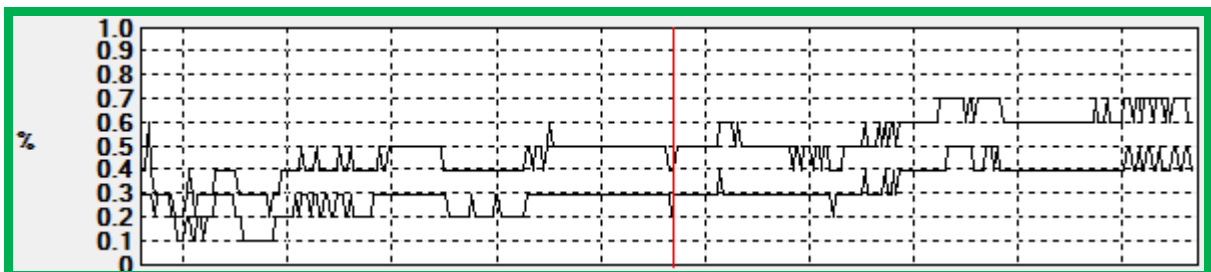
Voltage



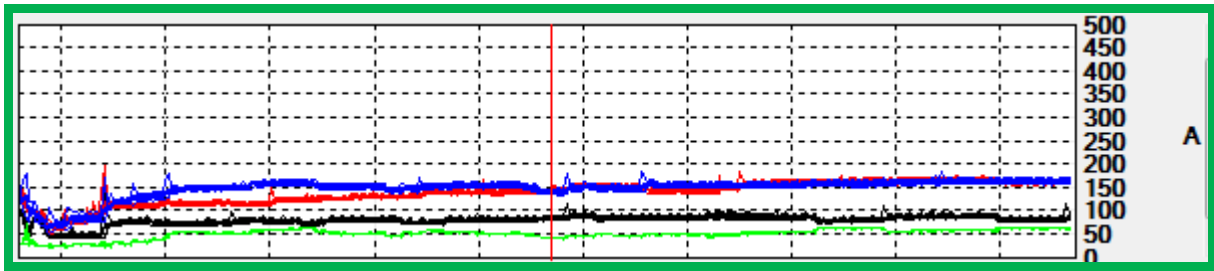
Voltage Harmonics



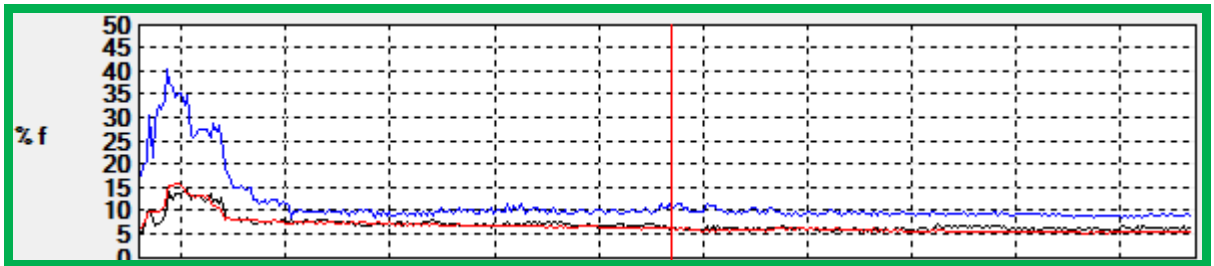
Voltage Un-balance



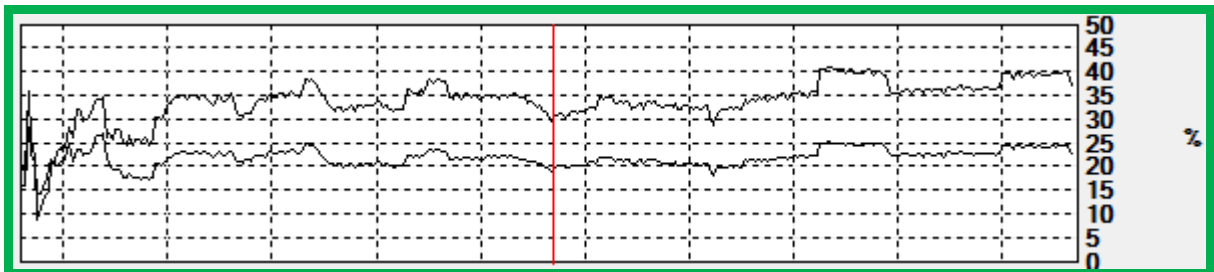
Current



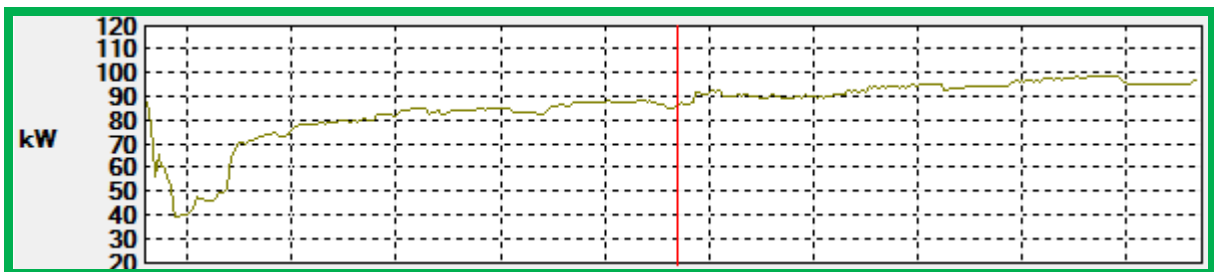
Current Harmonics



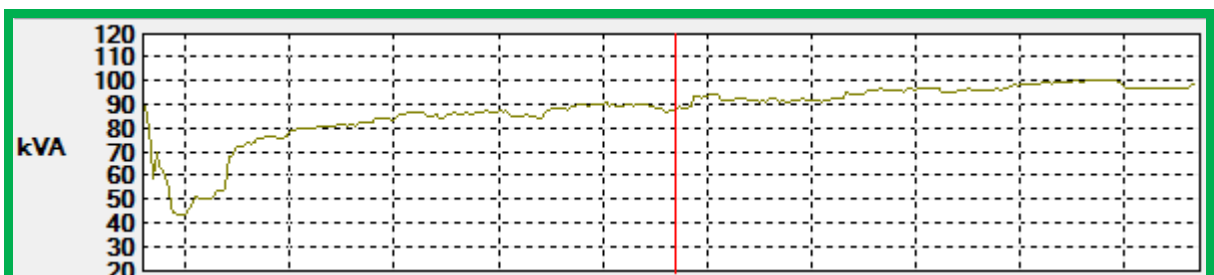
Current Un-balance



Power in KW

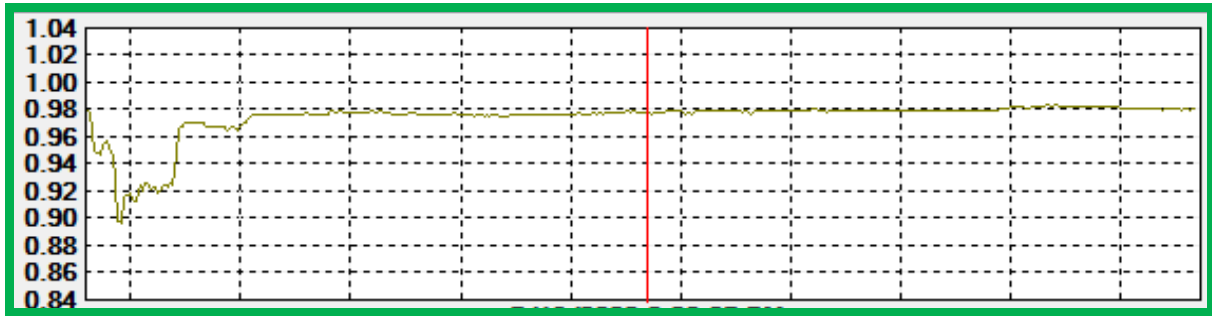


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	412.30	408.30	409.20	46.20	65.40	66.30	0.95	0.95	0.79	50.93	0.20	9.00
MAX	413.40	411.80	413.70	101.10	170.20	167.40	1.00	1.00	0.97	51.32	0.70	41.10
AVG	412.91	409.57	410.26	81.06	139.91	148.91	0.98	0.99	0.96	51.02	0.49	33.89

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.52	0.53	0.58	1.00	1.00	1.01	0.90	1.40	1.20	5.50	5.20	8.50
MAX	0.58	0.59	0.61	1.03	1.03	1.11	1.60	2.20	2.00	14.50	16.00	40.40
AVG	0.57	0.58	0.60	1.01	1.01	1.01	1.01	1.56	1.44	7.14	6.87	11.51



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



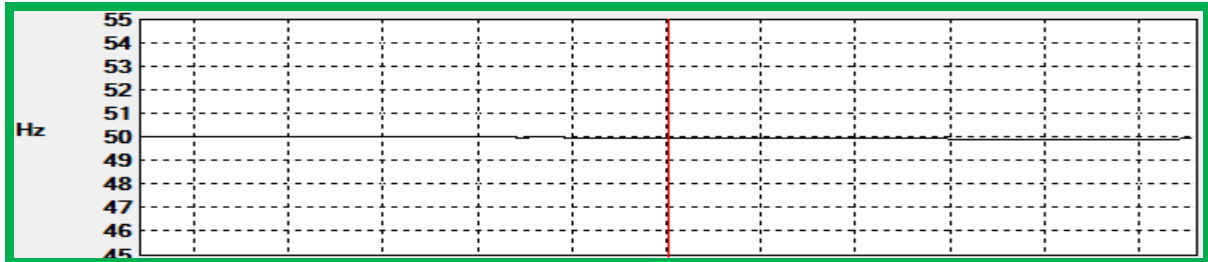
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.41	1.40	1.41	1.59	1.56	1.47
MAX	1.43	1.43	1.43	1.94	1.78	2.70
AVG	1.41	1.41	1.41	1.66	1.60	1.56

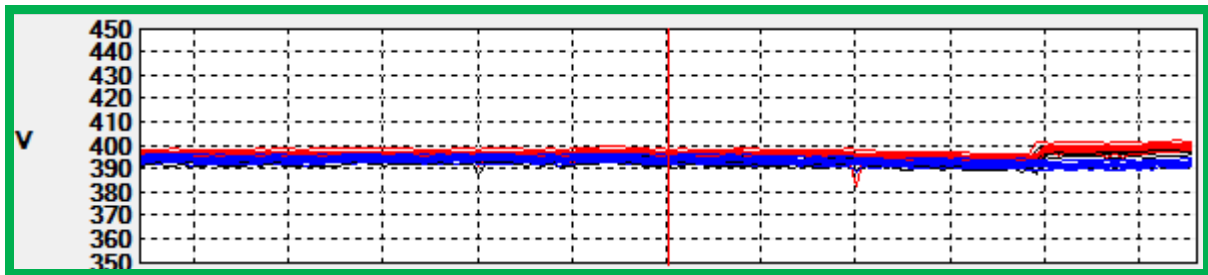


**B16-For-Library, Workshop and New Hostel (SS-C)**

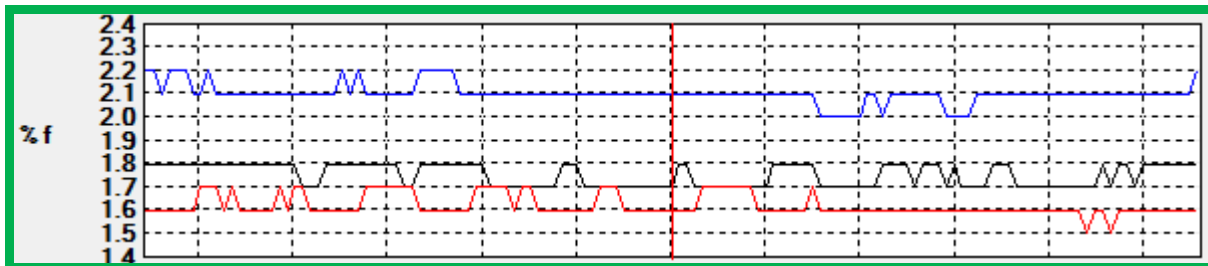
Frequency



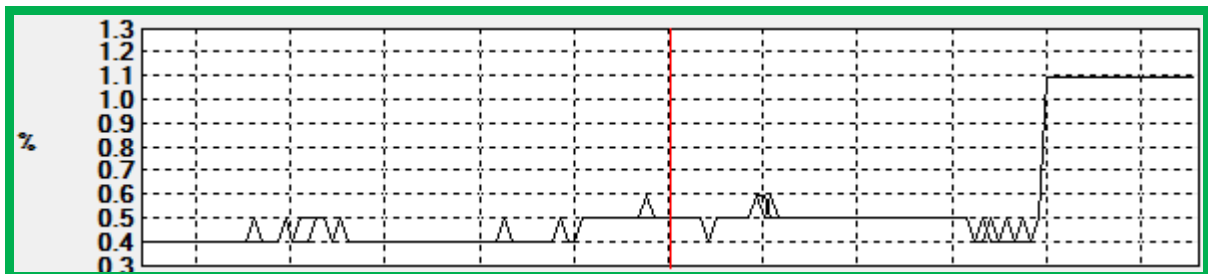
Voltage



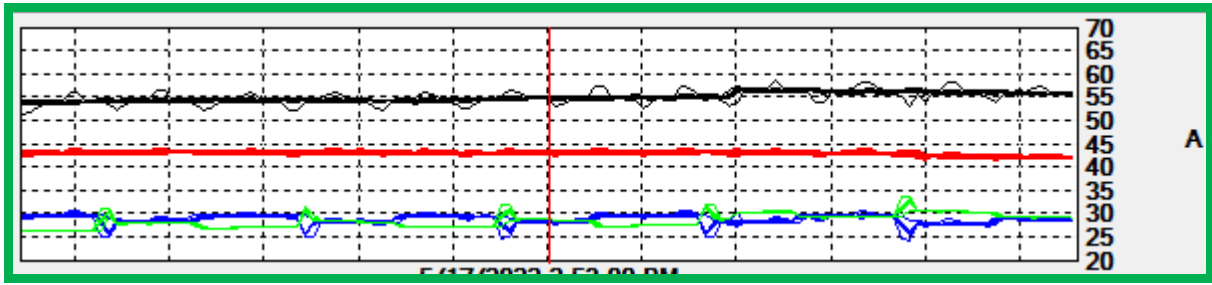
Voltage Harmonics



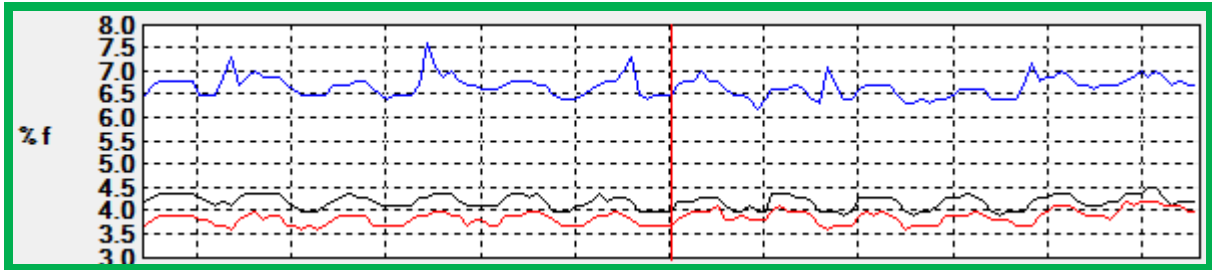
Voltage Un-balance



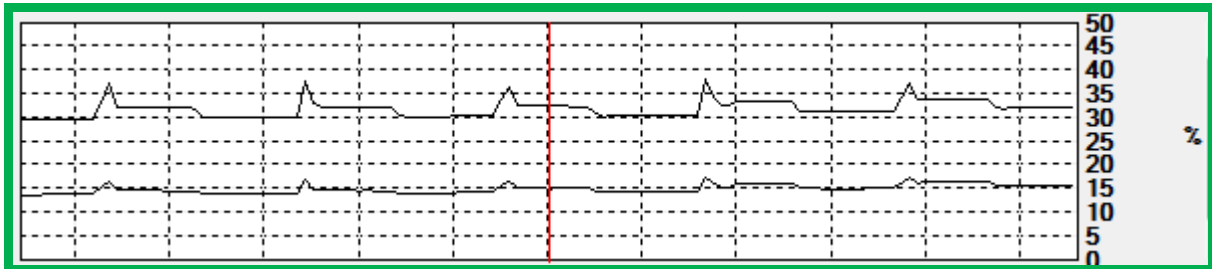
Current



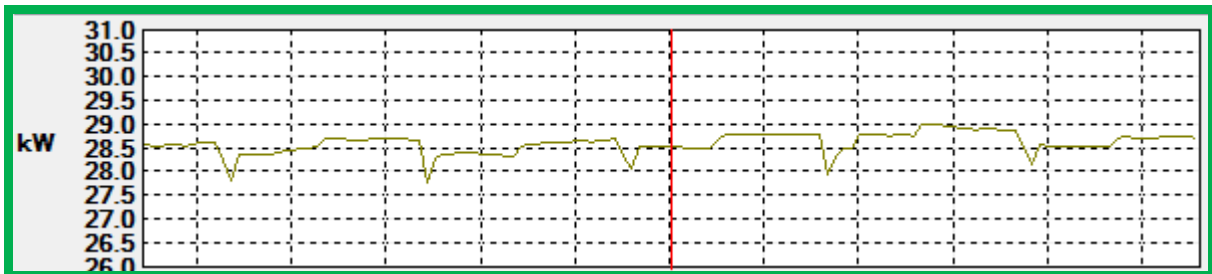
Current Harmonics



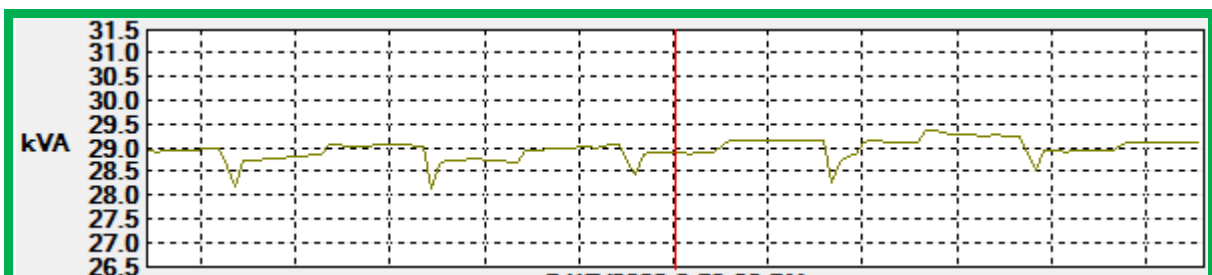
Current Un-balance



Power in KW



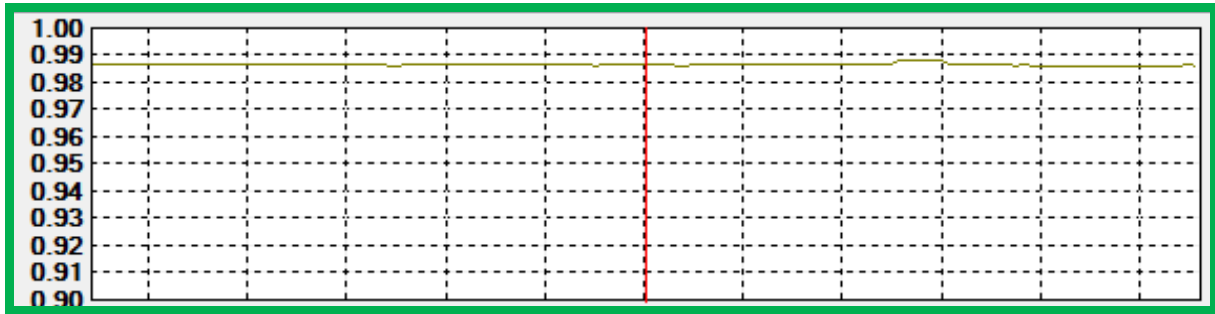
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	391.70	394.50	391.80	53.91	42.22	25.59	1.00	0.98	0.97	49.90	0.40	29.60
MAX	398.40	400.10	394.90	56.64	43.53	29.85	1.00	0.98	0.98	50.04	1.10	38.30
AVG	394.01	396.87	393.66	55.17	43.13	28.93	1.00	0.98	0.97	49.98	0.55	31.82

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.00	1.00	1.40	1.80	1.90	3.90	3.60	6.20
MAX	---	---	---	1.00	1.00	1.01	1.60	2.00	2.10	4.50	4.20	7.60
AVG	---	---	---	1.00	1.00	1.01	1.50	1.92	1.97	4.21	3.86	6.67



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



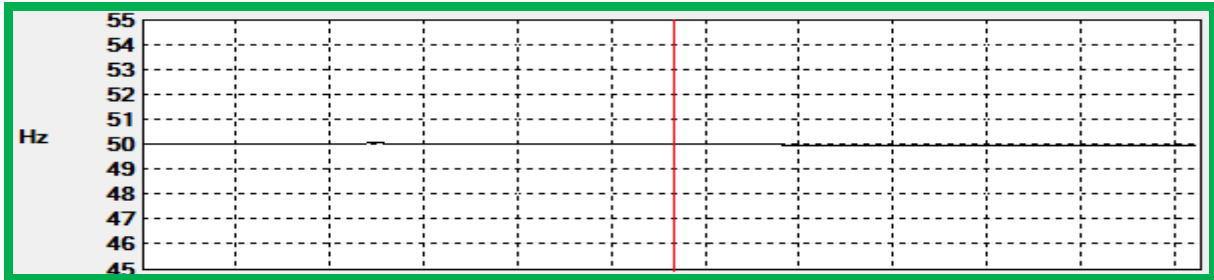
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.43	1.49	1.46	1.51
MAX	1.43	1.43	1.44	1.52	1.53	1.55
AVG	1.43	1.43	1.44	1.50	1.48	1.51

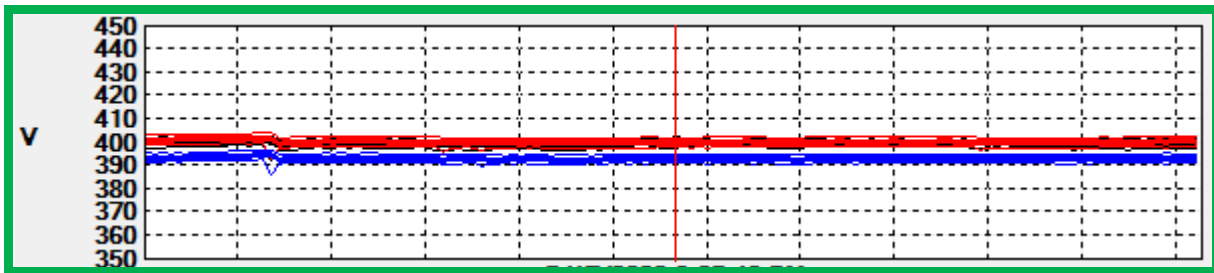


**B17-For-D-Block Mechanical (SS-C)**

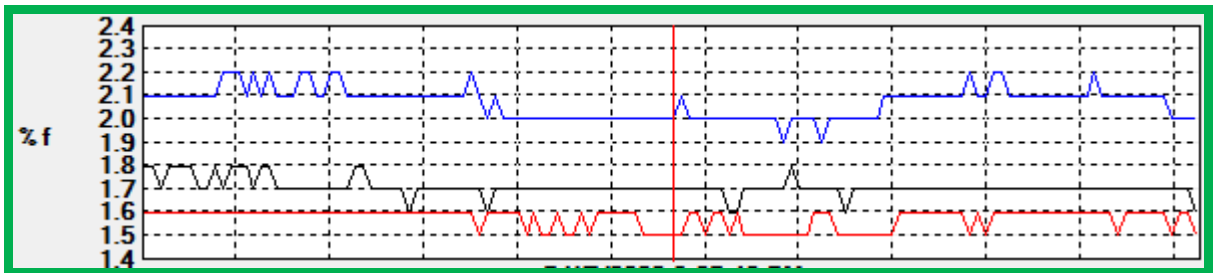
Frequency



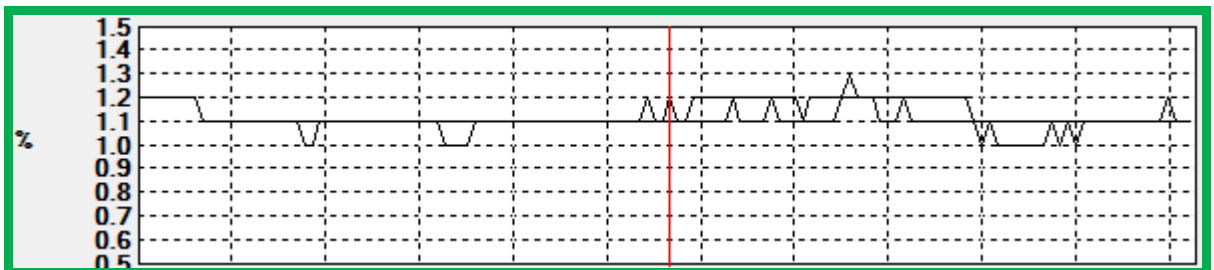
Voltage



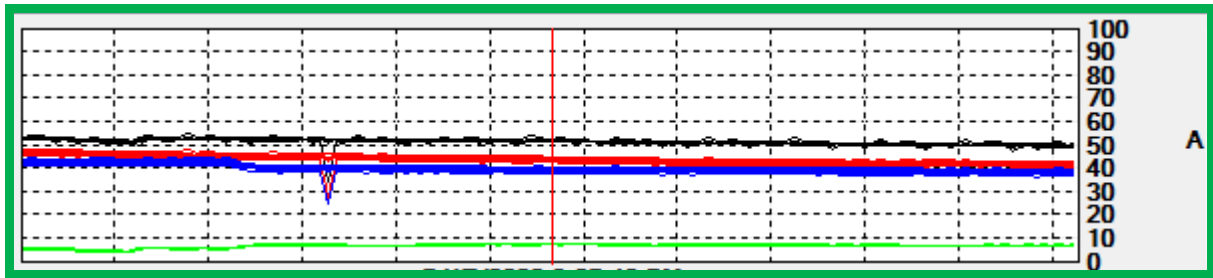
Voltage Harmonics



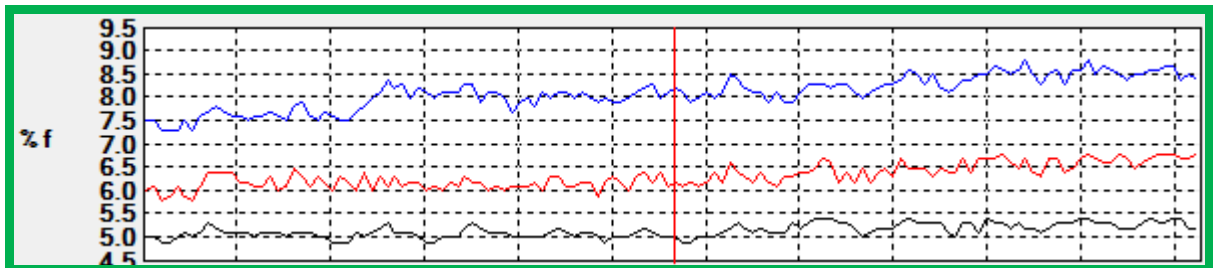
Voltage Un-balance



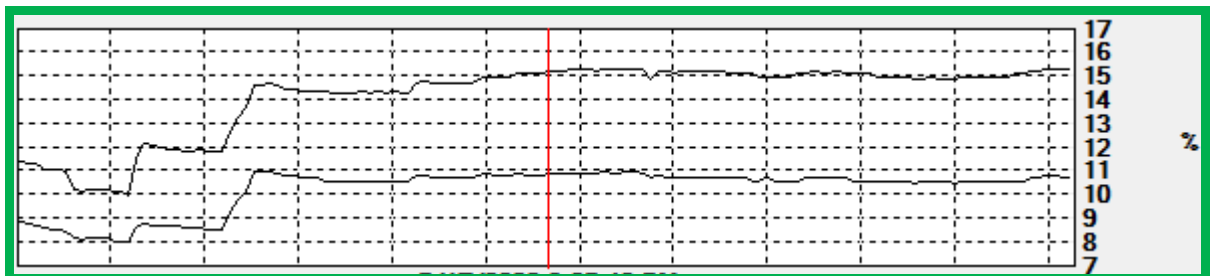
Current



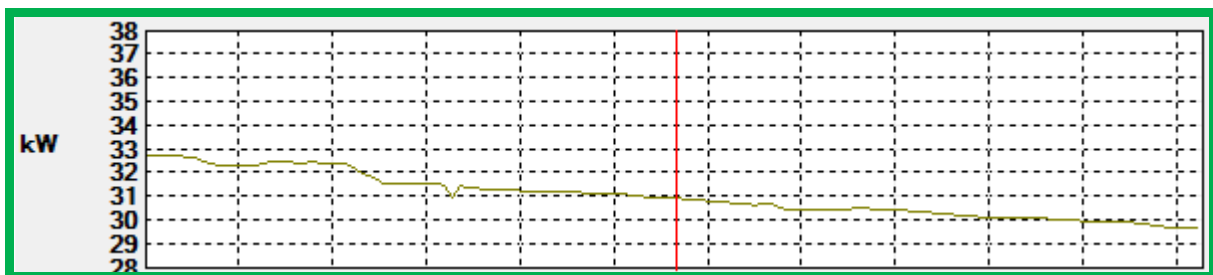
Current Harmonics



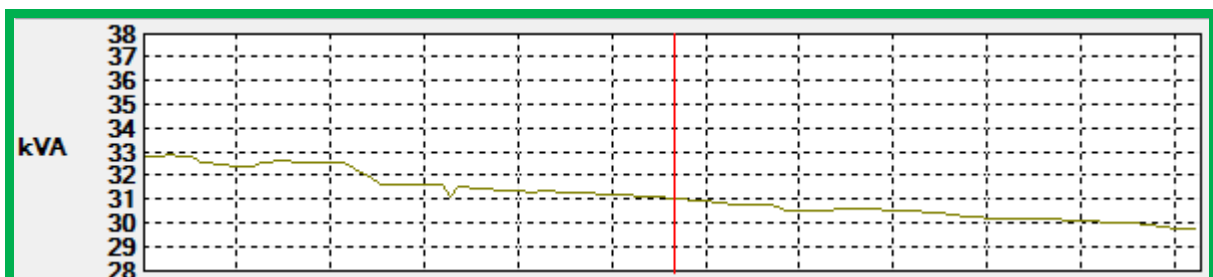
Current Un-balance



Power in KW



Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	398.50	399.50	392.40	49.86	41.53	38.36	1.00	0.99	0.99	49.94	1.10	10.00
MAX	400.70	401.90	394.60	53.22	47.07	43.21	1.00	1.00	1.00	50.07	1.30	15.30
AVG	399.59	400.26	393.10	51.62	43.93	40.15	1.00	0.99	1.00	50.01	1.14	14.16

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.23	1.33	1.33	1.00	1.00	1.01	1.30	1.70	1.90	4.90	5.80	7.30
MAX	1.23	1.33	1.33	1.00	1.01	1.01	1.50	2.00	2.10	5.40	6.80	8.80
AVG	1.23	1.33	1.33	1.00	1.00	1.01	1.43	1.86	1.98	5.14	6.32	8.10



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



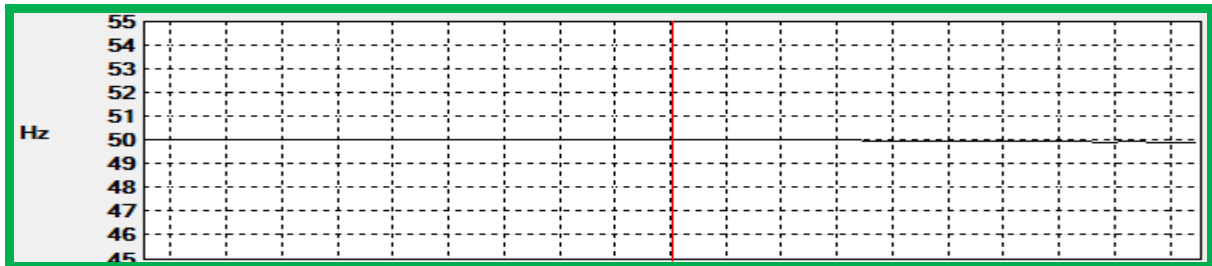
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.44	1.50	1.52	1.52
MAX	1.43	1.43	1.44	1.53	1.56	1.57
AVG	1.43	1.43	1.44	1.51	1.53	1.54

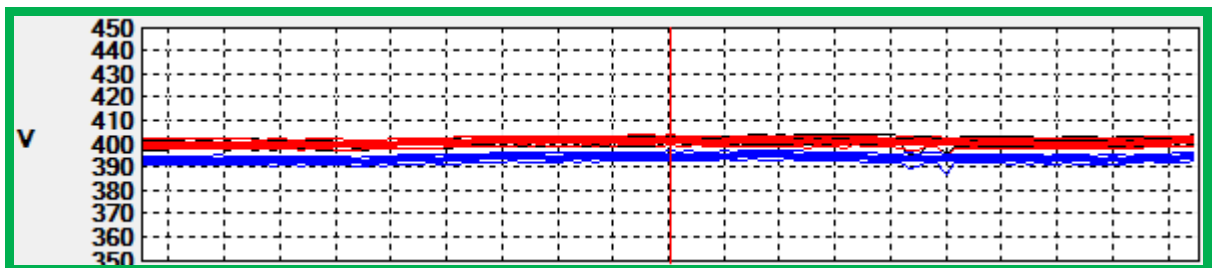


### B18-For-Block-A, B and Admin Block (SS-C)

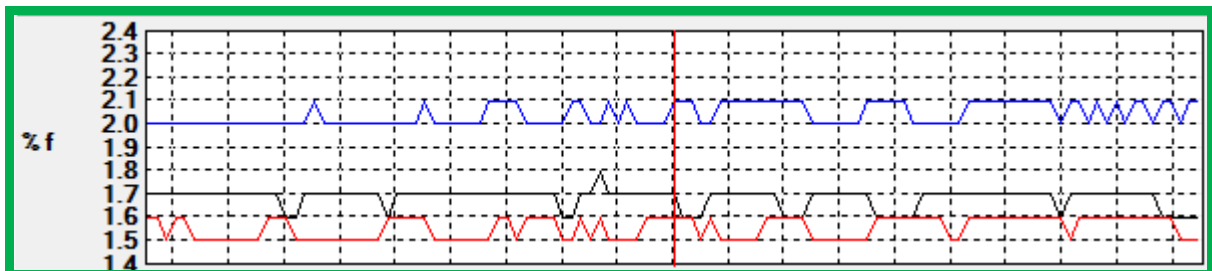
Frequency



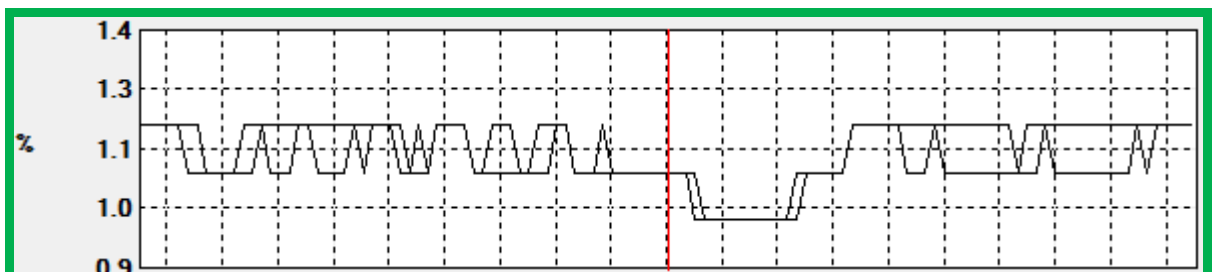
Voltage



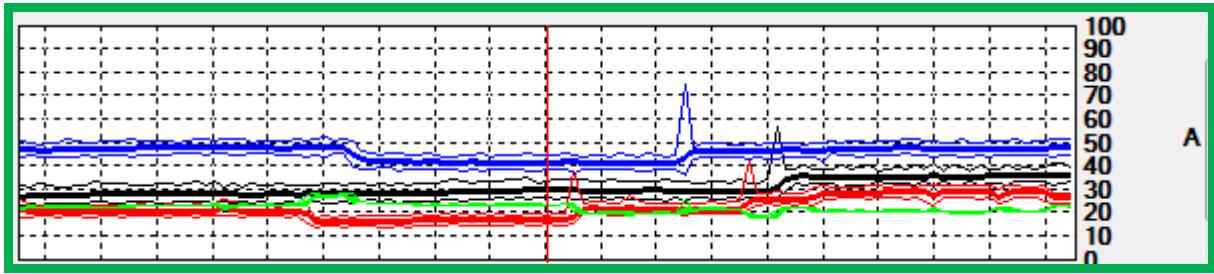
Voltage Harmonics



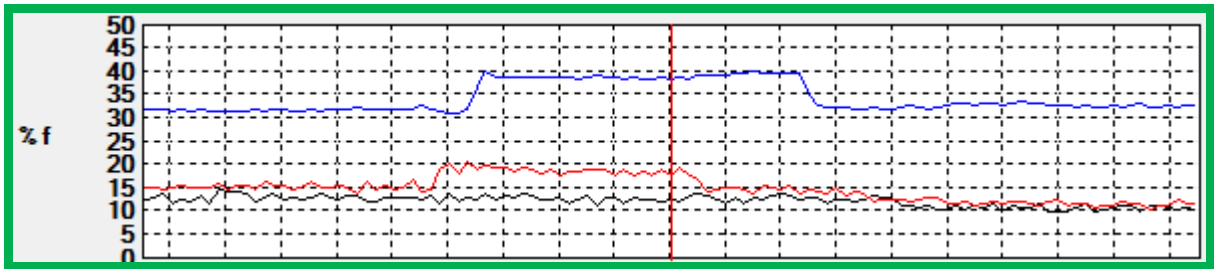
Voltage Un-balance



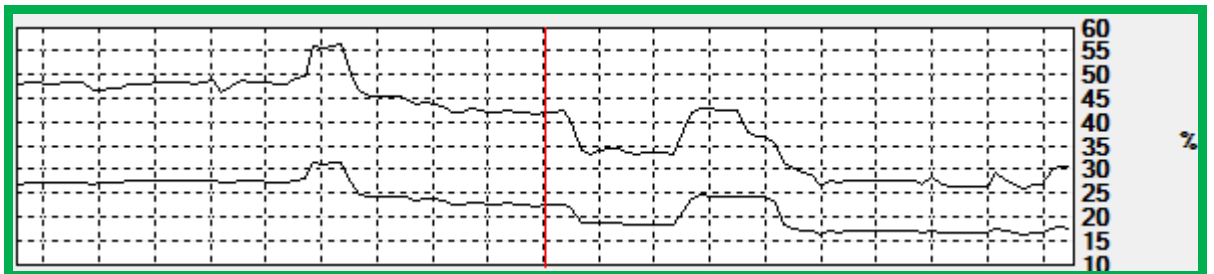
Current



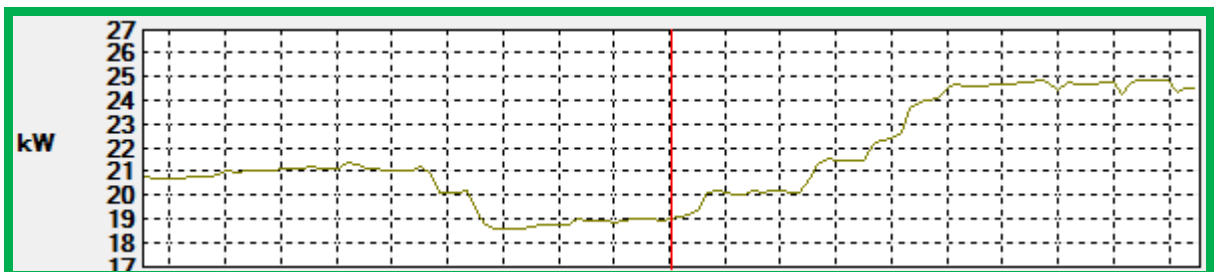
Current Harmonics



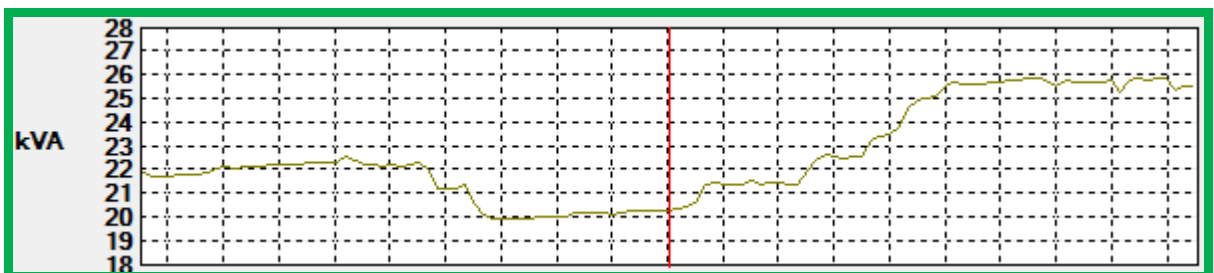
Current Un-balance



Power in KW



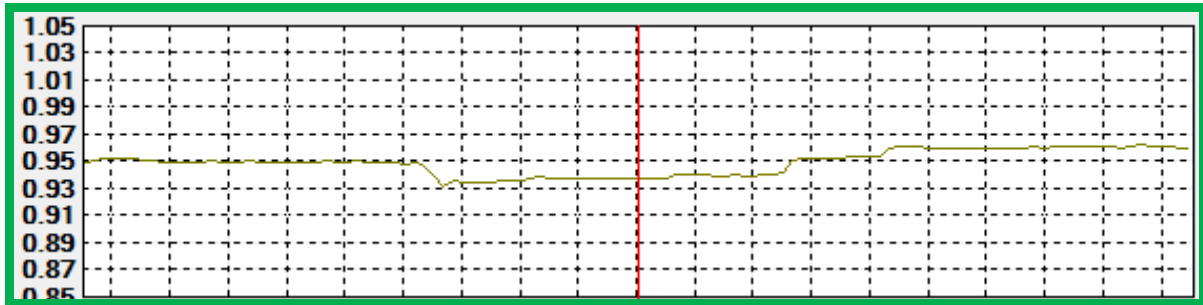
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	399.80	399.90	392.60	27.13	16.18	41.19	0.96	0.98	0.89	49.93	1.00	26.00
MAX	402.20	401.90	395.50	36.34	29.10	48.59	0.99	0.99	0.93	50.04	1.20	56.50
AVG	401.02	400.86	394.00	30.69	22.19	45.69	0.97	0.98	0.92	50.00	1.17	39.72

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.83	1.03	0.90	1.01	1.01	1.06	1.30	1.80	1.90	9.70	10.40	31.10
MAX	1.23	1.33	1.33	1.02	1.03	1.10	1.40	1.90	2.00	14.50	20.60	39.90
AVG	0.96	1.13	1.04	1.01	1.02	1.08	1.39	1.81	1.95	12.20	14.92	34.34



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



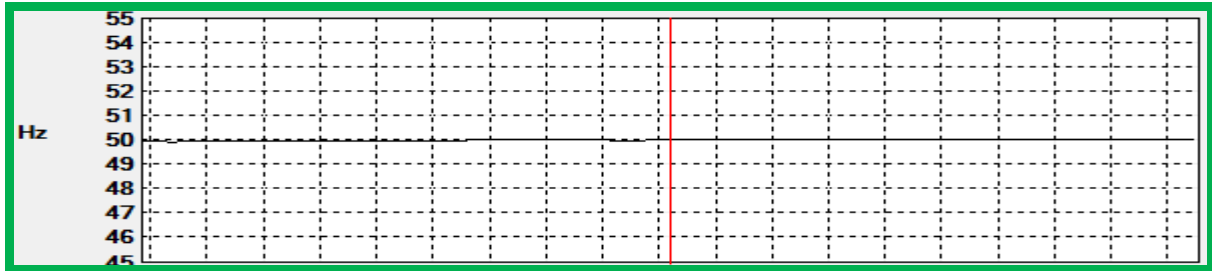
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.44	1.47	1.75	1.99
MAX	1.43	1.44	1.44	1.81	2.09	2.31
AVG	1.43	1.43	1.44	1.51	1.88	2.08

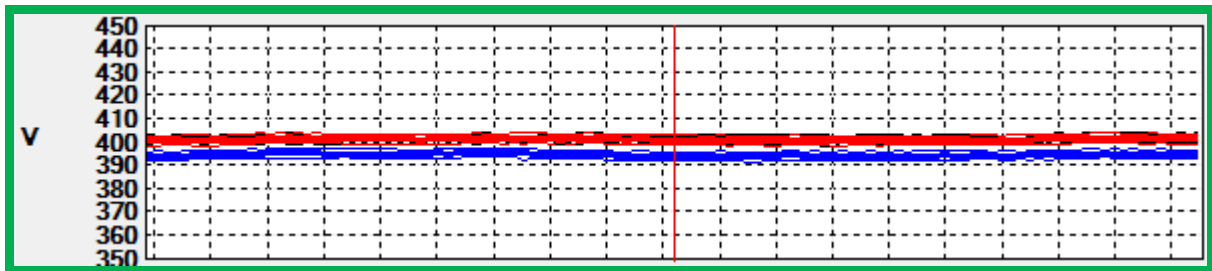


### B19-For-Water Tank and Sewer pumping station (SS-C)

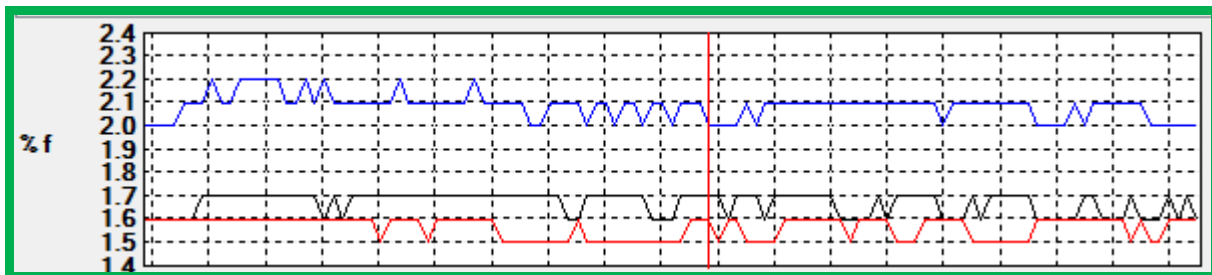
Frequency



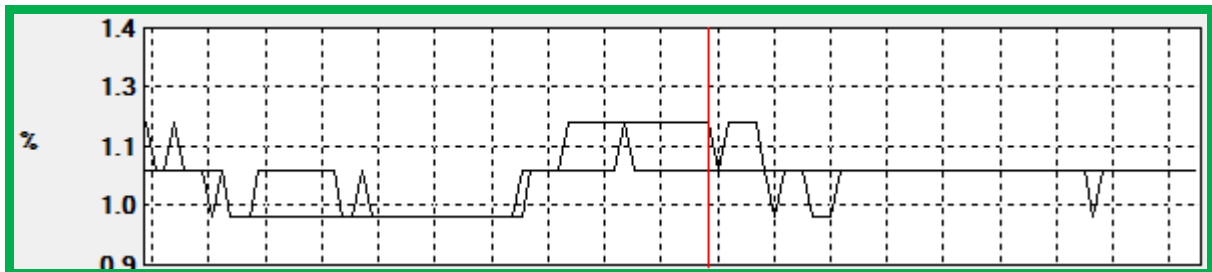
Voltage



Voltage Harmonics



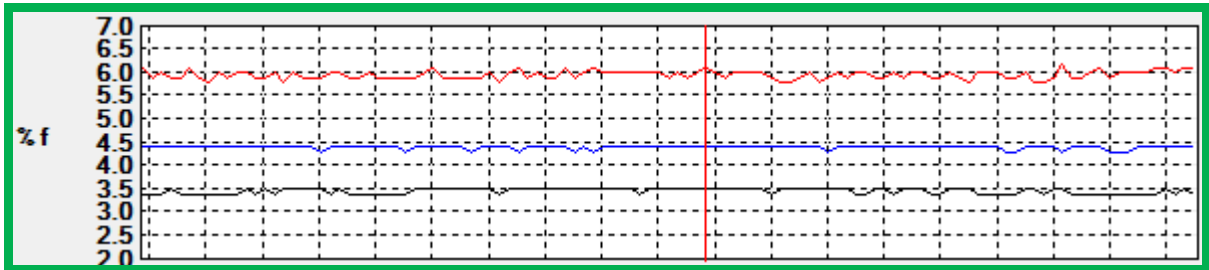
Voltage Un-balance



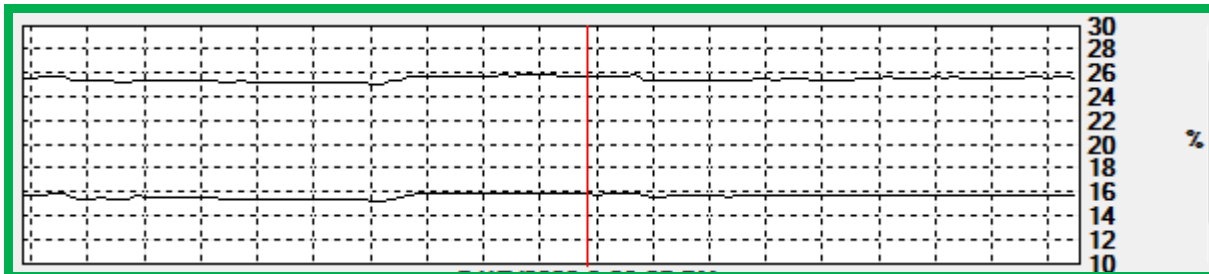
Current



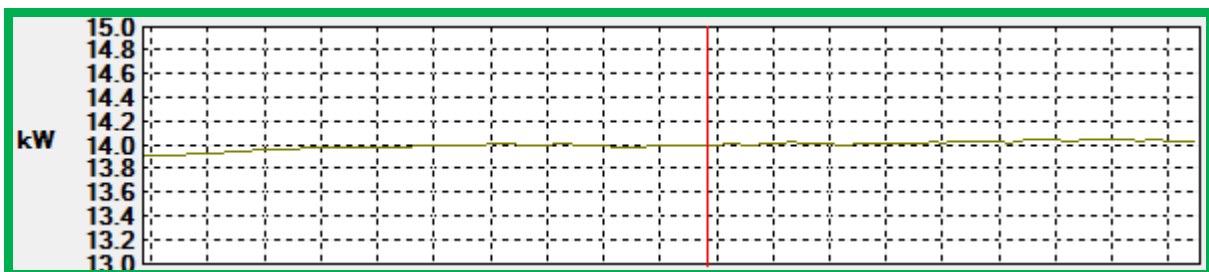
Current Harmonics



Current Un-balance



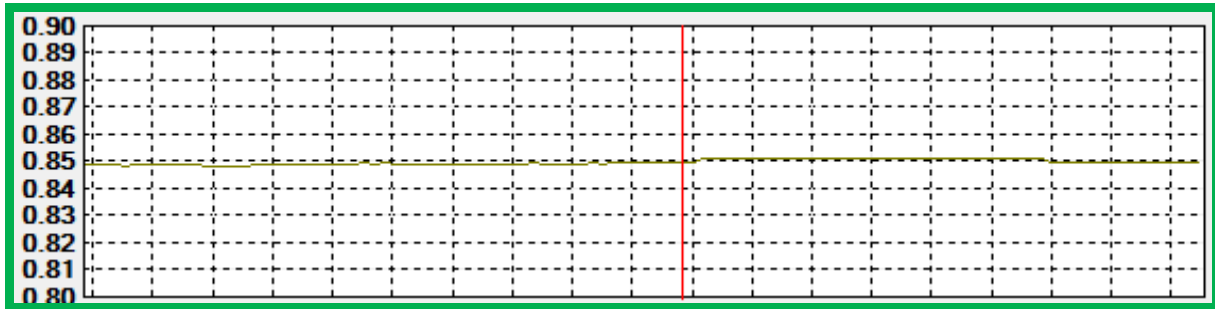
Power in KW



Power in KVA



Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	400.80	400.60	393.80	20.87	29.72	20.37	0.85	0.88	0.80	49.93	1.00	25.10
MAX	402.10	402.00	395.70	21.04	29.96	20.64	0.85	0.88	0.80	50.05	1.20	25.90
AVG	401.45	401.28	394.67	20.97	29.87	20.54	0.85	0.88	0.80	50.01	1.12	25.55

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.32	0.25	0.28	1.00	1.00	1.00	1.30	1.80	1.90	3.40	5.80	4.30
MAX	0.83	1.03	0.90	1.00	1.00	1.00	1.40	1.90	2.00	3.50	6.20	4.40
AVG	0.46	0.46	0.45	1.00	1.00	1.00	1.40	1.84	1.98	3.46	5.96	4.39



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ENERGY AUDIT

Rev 0

28-05-2022



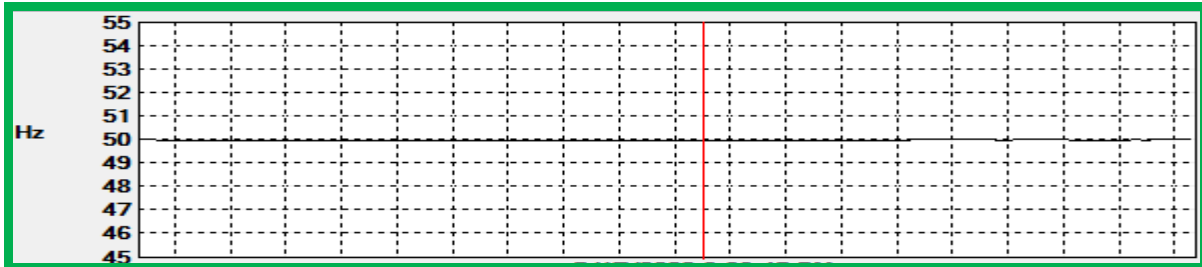
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.43	1.44	1.47	1.53	1.45
MAX	1.43	1.44	1.44	1.47	1.53	1.45
AVG	1.43	1.43	1.44	1.47	1.53	1.45

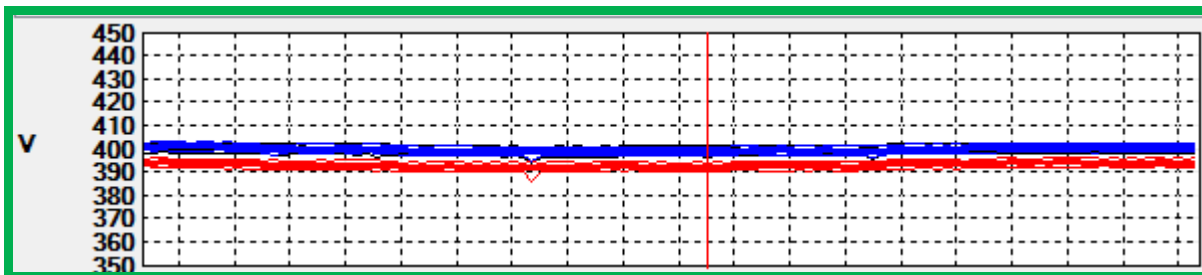


### B20-For-Applied Science (SS-C)

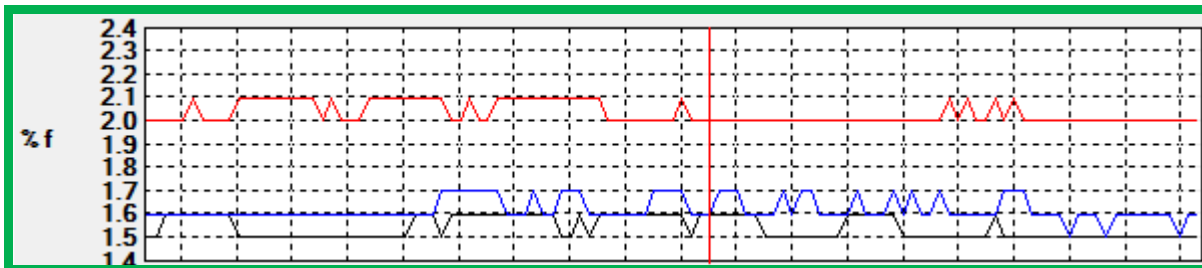
Frequency



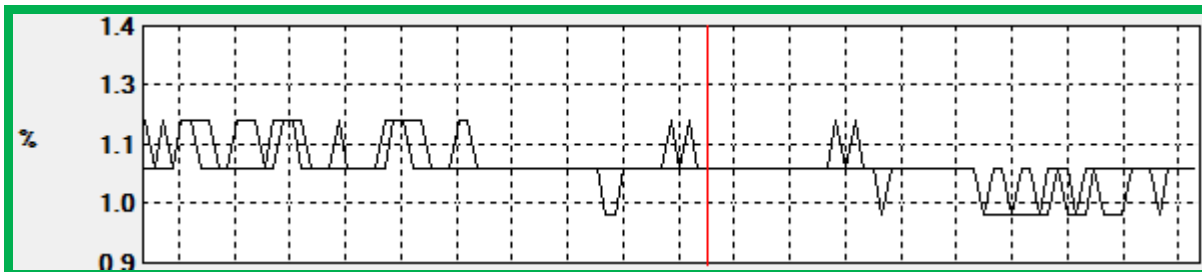
Voltage



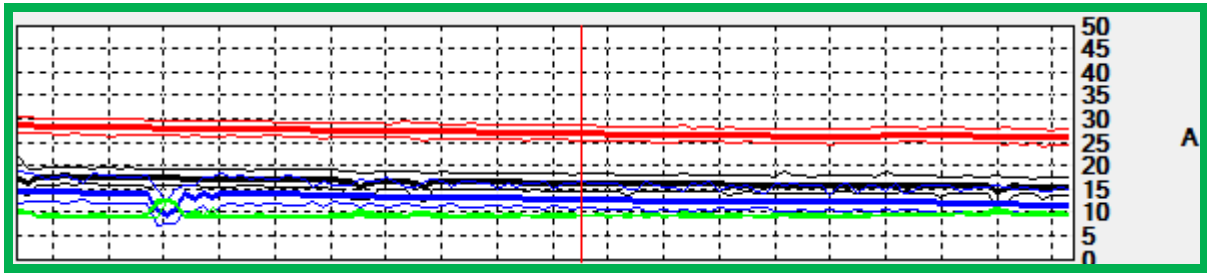
Voltage Harmonics



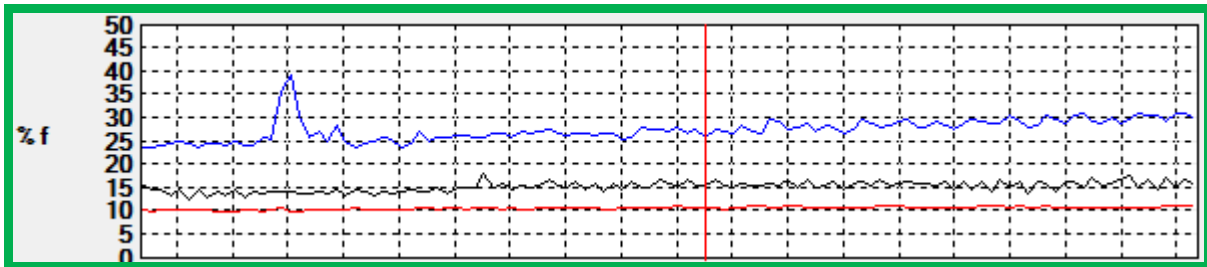
Voltage Un-balance



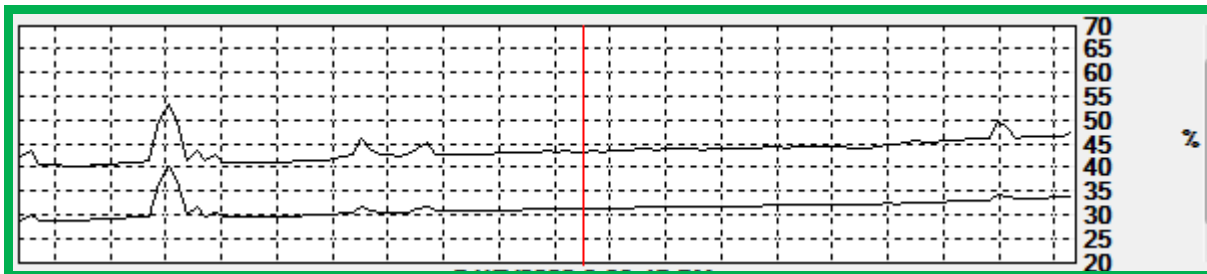
Current



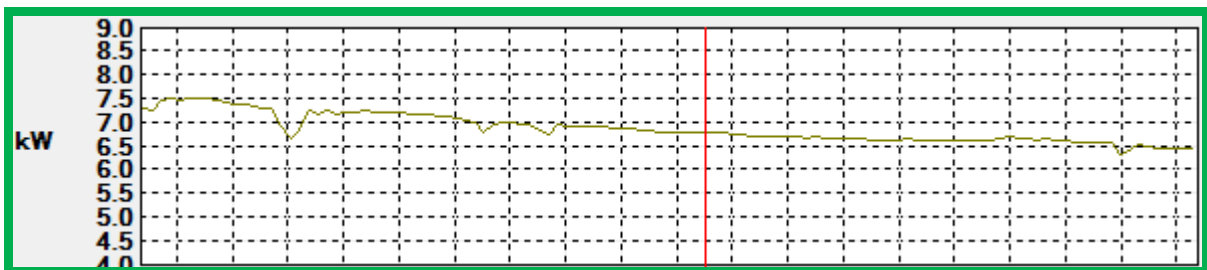
Current Harmonics



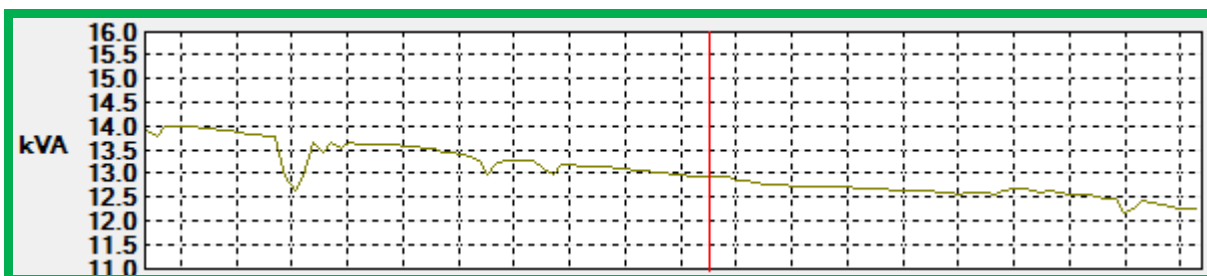
Current Un-balance



Power in KW



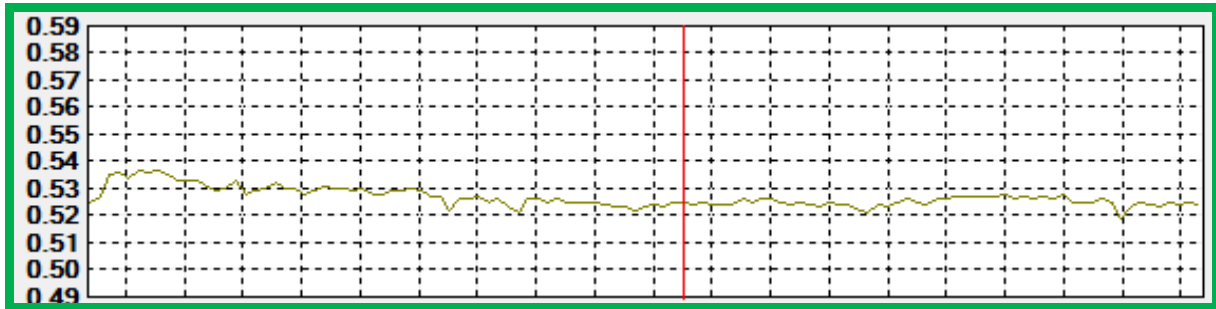
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	398.80	392.30	398.90	14.51	26.12	9.29	0.65	0.50	0.33	49.95	1.00	40.30
MAX	400.90	394.40	401.50	17.90	28.73	14.65	0.68	0.51	0.42	50.02	1.20	53.60
AVG	399.90	393.32	400.01	16.58	27.24	13.04	0.67	0.50	0.39	49.98	1.11	43.79

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.32	0.25	0.28	1.02	1.01	1.06	1.80	1.90	1.30	12.60	9.90	23.50
MAX	3.71	3.97	3.90	1.02	1.01	1.15	1.90	2.00	1.40	18.10	11.30	39.30
AVG	3.26	3.47	3.42	1.02	1.01	1.07	1.81	1.93	1.38	15.28	10.64	27.51



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ENERGY AUDIT

Rev 0

28-05-2022



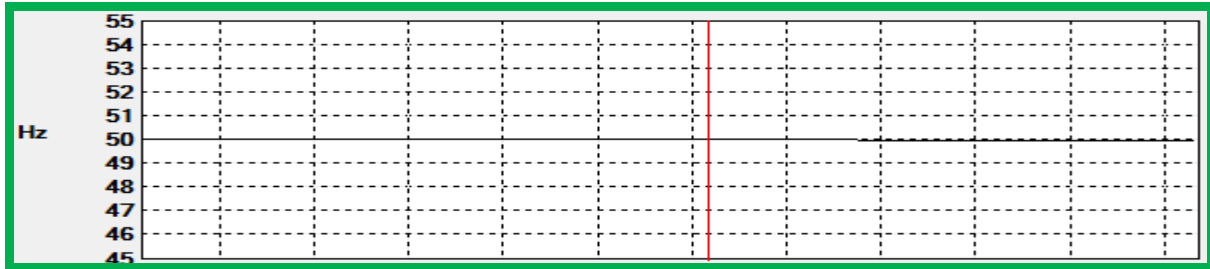
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.44	1.43	1.53	1.62	1.78
MAX	1.44	1.44	1.43	1.67	1.66	2.22
AVG	1.43	1.44	1.43	1.57	1.63	1.84

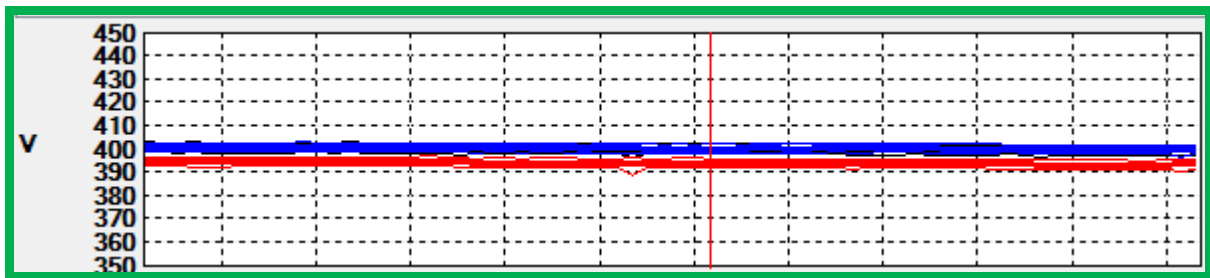


### B21-For-Block-C and Horticulture (SS-C)

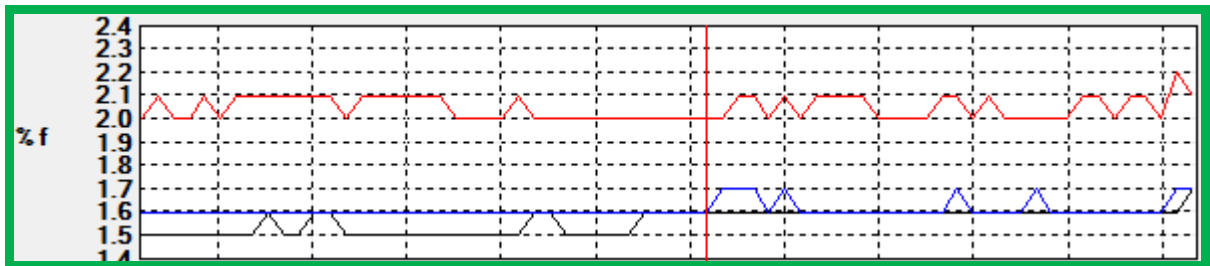
Frequency



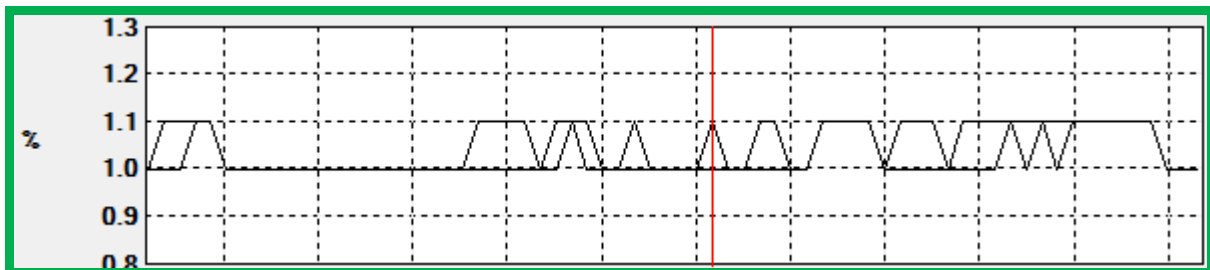
Voltage



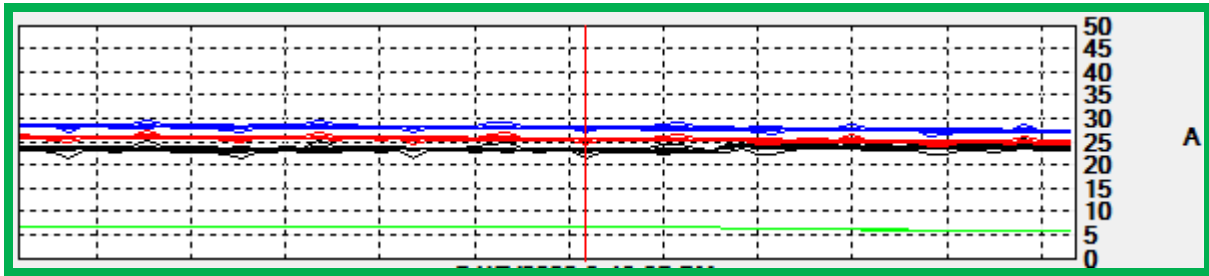
Voltage Harmonics



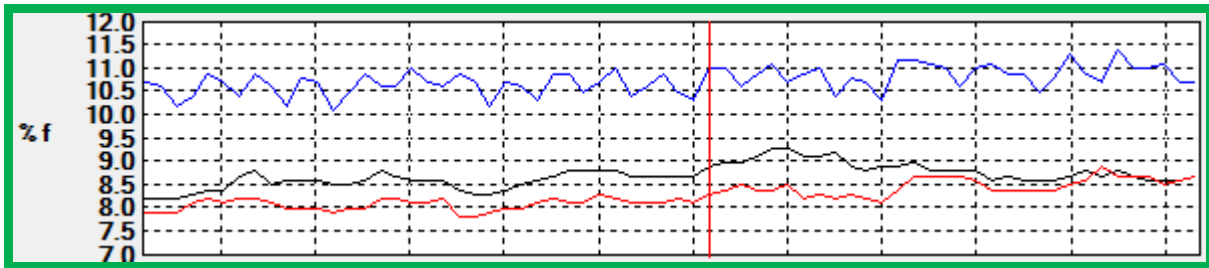
Voltage Un-balance



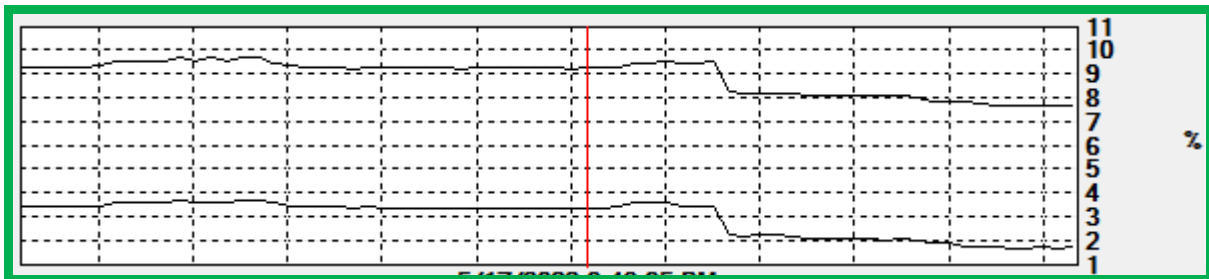
Current



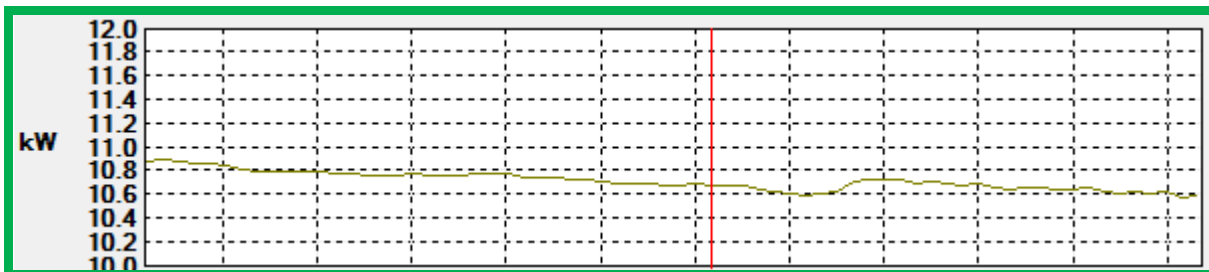
Current Harmonics



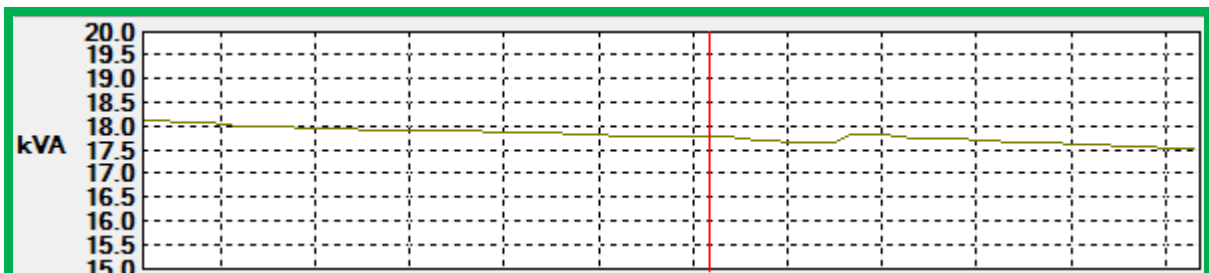
Current Un-balance



Power in KW

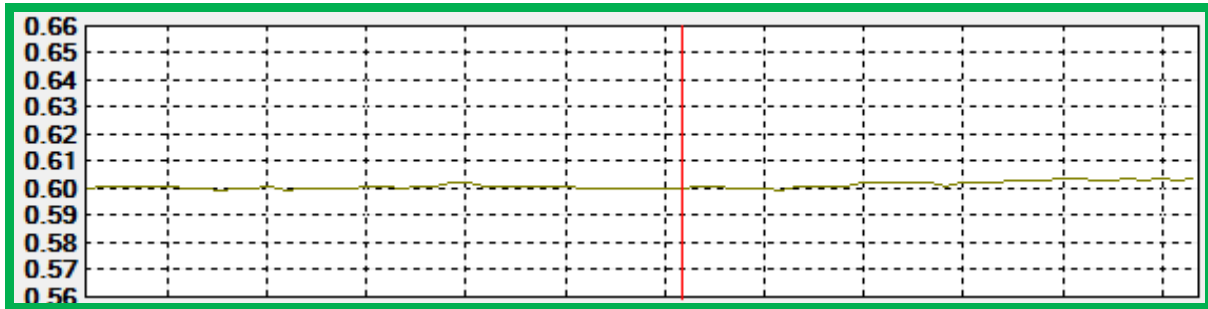


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	399.30	393.20	399.90	23.15	25.01	27.41	0.66	0.56	0.58	49.99	1.00	7.70
MAX	401.00	395.00	401.20	24.09	26.26	28.68	0.67	0.57	0.59	50.03	1.10	9.70
AVG	400.23	394.17	400.53	23.66	25.70	28.13	0.66	0.56	0.58	50.01	1.04	8.93

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.50	0.38	0.41	1.01	1.01	1.01	1.70	1.80	1.30	8.20	7.80	10.10
MAX	3.71	3.97	3.90	1.01	1.01	1.02	1.90	2.10	1.50	9.30	8.90	11.40
AVG	0.72	0.62	0.65	1.01	1.01	1.01	1.83	1.93	1.37	8.70	8.26	10.75



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



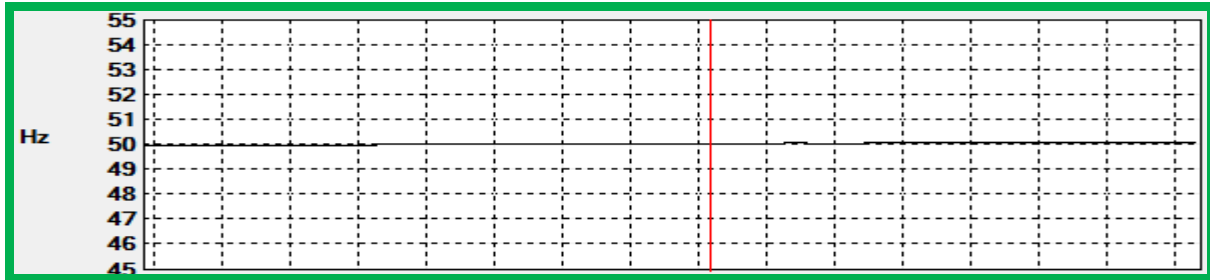
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.44	1.43	1.59	1.56	1.56
MAX	1.44	1.44	1.43	1.65	1.59	1.58
AVG	1.43	1.44	1.43	1.61	1.58	1.57

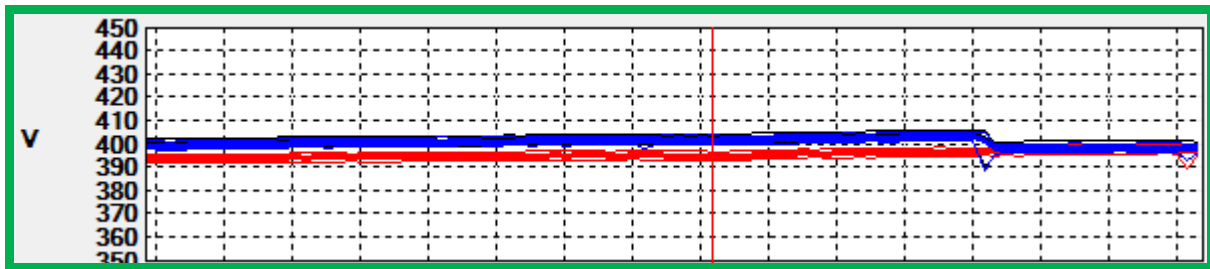


### B22-For-APJ Abdul Kalam Hostel (SS-C)

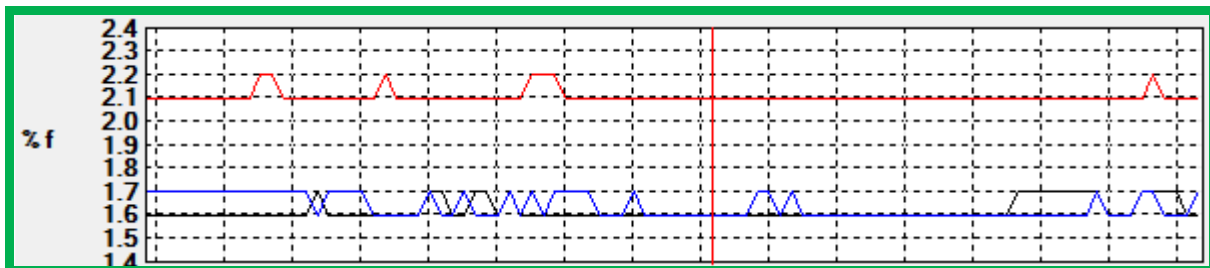
Frequency



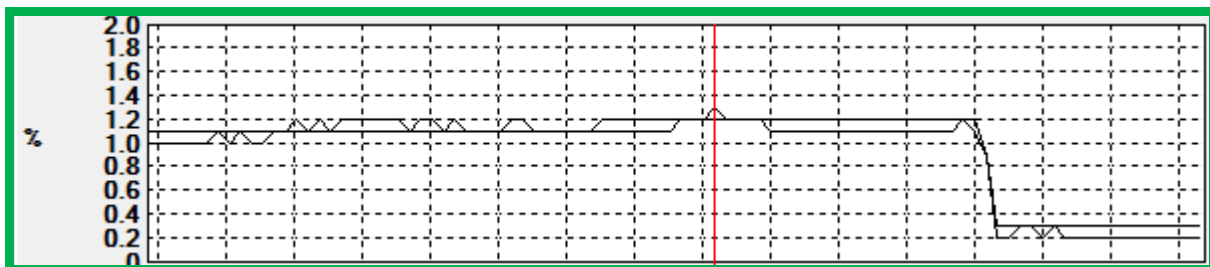
Voltage



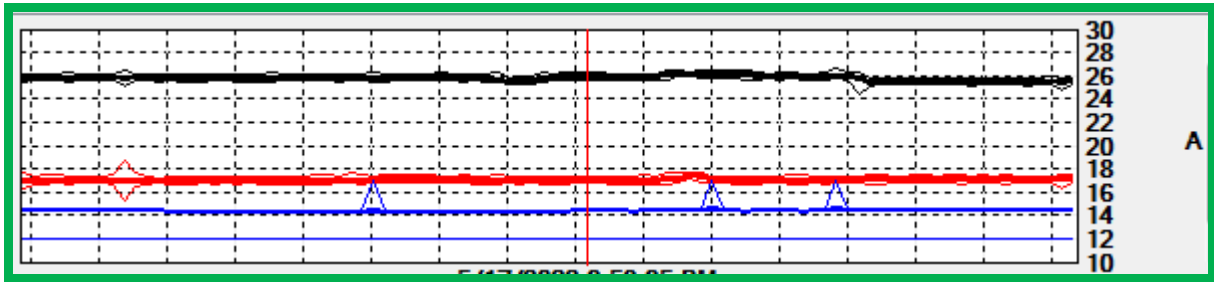
Voltage Harmonics



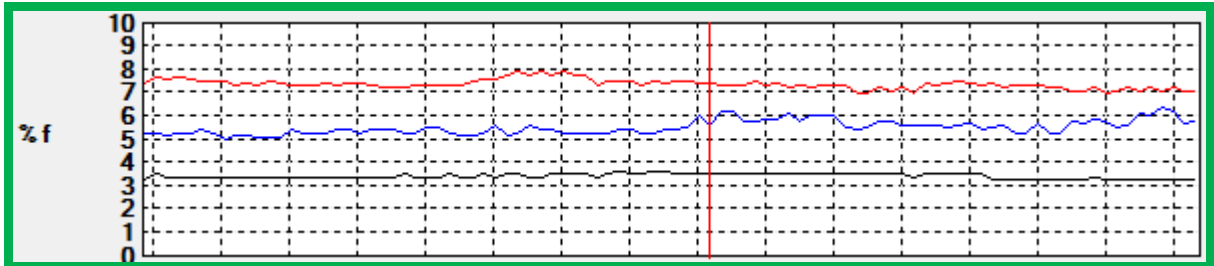
Voltage Un-balance



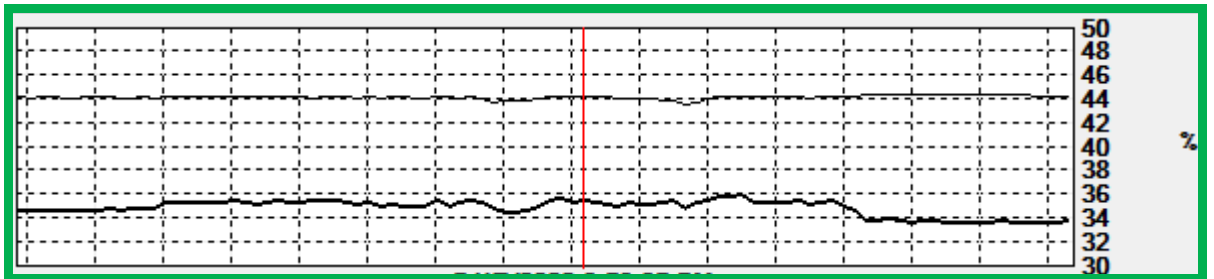
Current



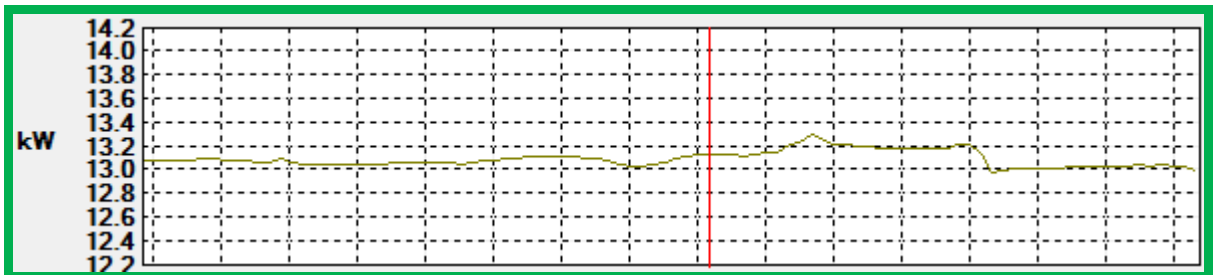
Current Harmonics



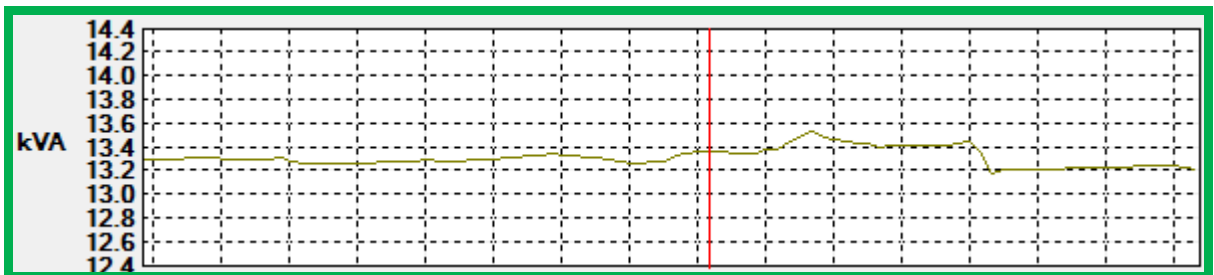
Current Un-balance



Power in KW



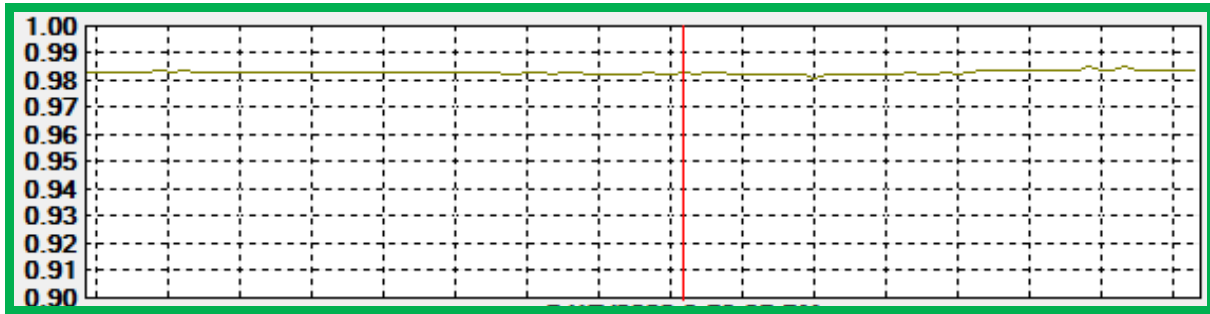
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	398.80	393.60	398.20	25.52	17.06	14.40	0.97	0.99	0.98	49.97	0.20	90.00
MAX	403.90	397.90	403.50	26.24	17.51	14.70	0.98	0.99	0.99	50.09	1.20	90.30
AVG	401.43	395.61	400.89	25.88	17.14	14.58	0.98	0.99	0.99	50.04	0.92	90.17

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.50	0.38	0.41	1.00	1.00	1.00	1.80	1.90	1.40	3.30	7.00	5.00
MAX	3.41	4.04	3.77	1.00	1.01	1.01	2.00	2.10	1.50	3.60	7.90	6.40
AVG	3.21	3.78	3.53	1.00	1.00	1.00	1.93	1.99	1.41	3.43	7.36	5.52



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



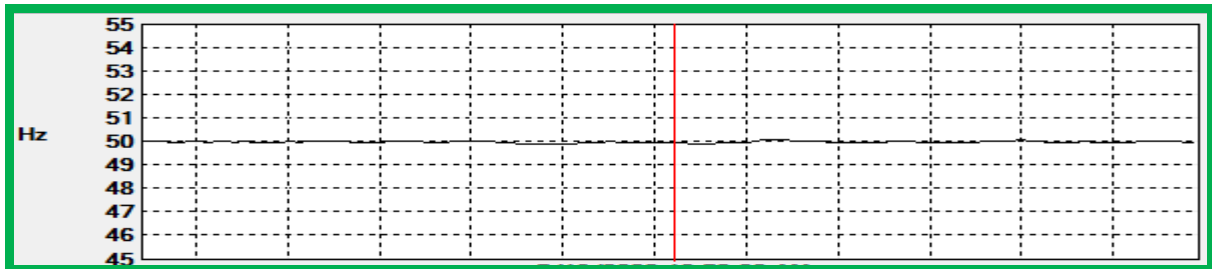
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.43	1.44	1.43	1.43	1.62	1.54
MAX	1.44	1.44	1.43	1.48	1.69	1.71
AVG	1.43	1.44	1.43	1.44	1.63	1.60

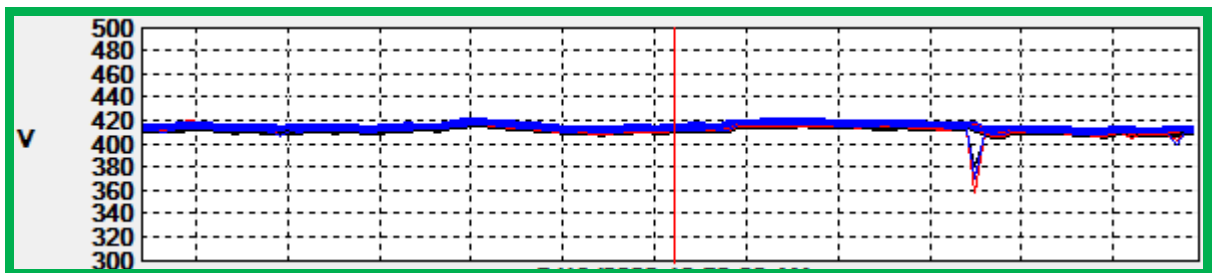


### A9-For-Outgoing transformer 630 KVA (SS-D)

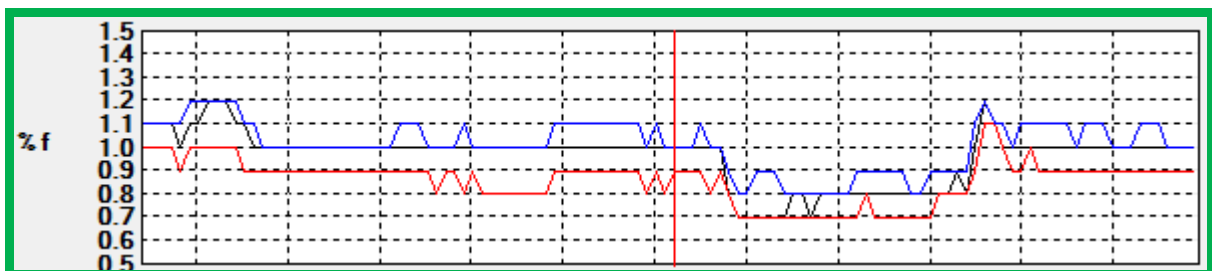
Frequency



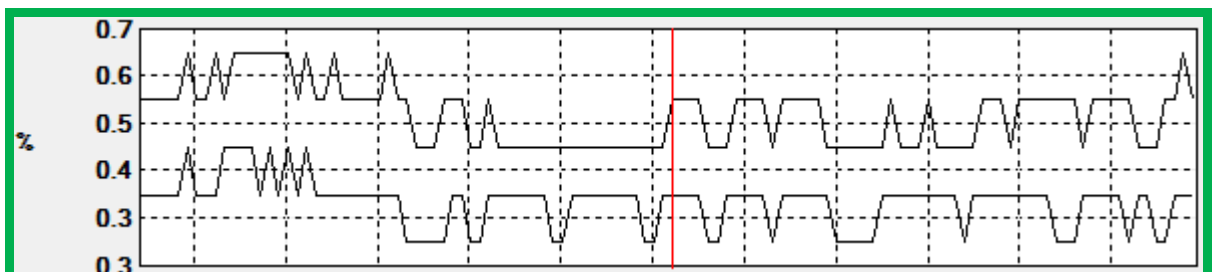
Voltage



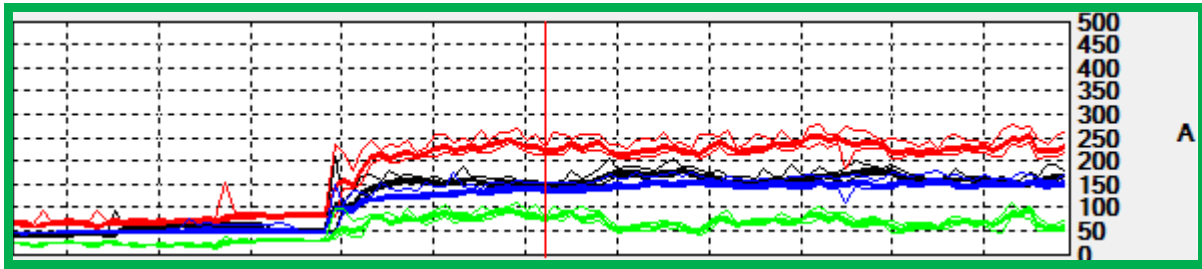
Voltage Harmonics



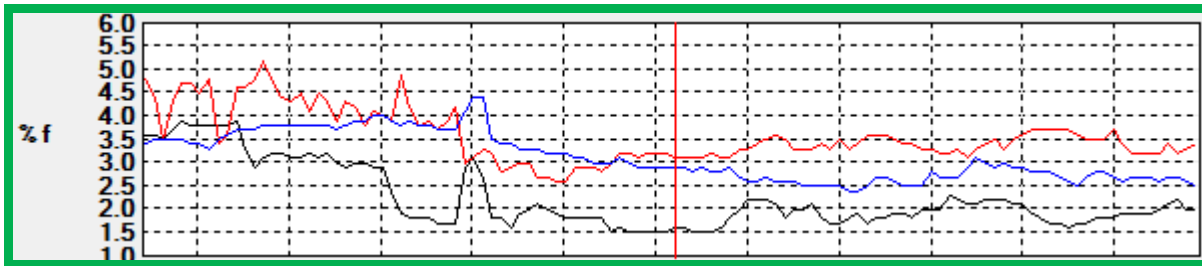
Voltage Un-balance



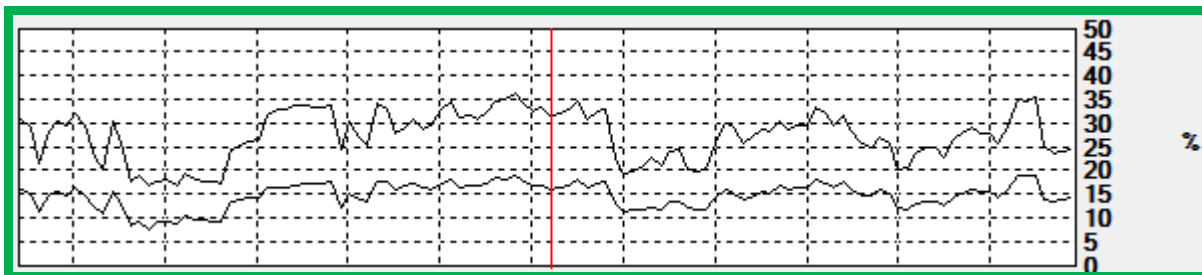
Current



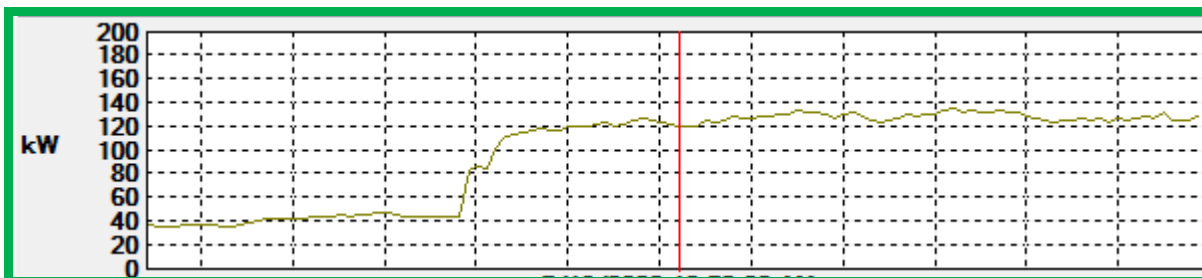
Current Harmonics



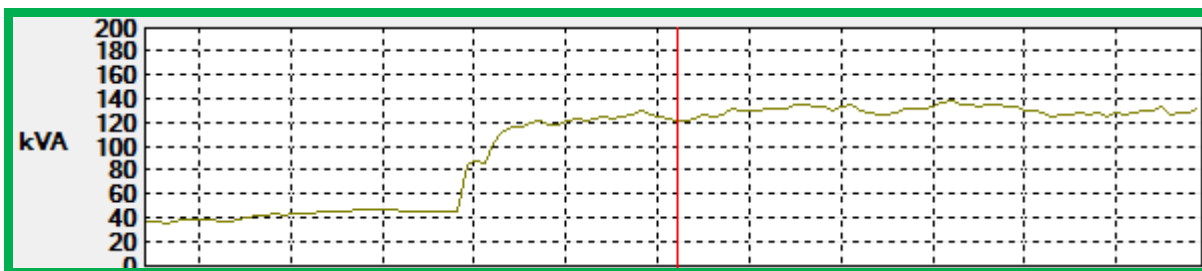
Current Un-balance



Power in KW

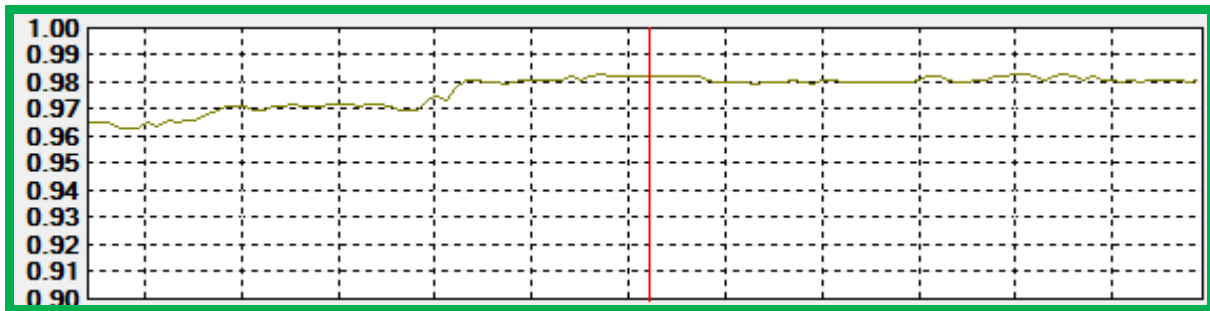


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	408.00	409.60	410.90	40.70	61.30	48.10	0.94	0.98	0.96	49.91	0.30	16.80
MAX	417.40	419.50	419.60	181.10	256.80	159.90	0.99	0.99	0.98	50.07	0.50	36.60
AVG	412.47	414.48	415.27	127.75	181.16	115.80	0.98	0.98	0.97	49.99	0.39	27.54

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.20	0.20	0.18	1.00	1.00	1.00	0.70	0.70	0.70	1.50	2.60	2.40
MAX	1.74	1.42	1.74	1.00	1.00	1.00	1.10	1.20	1.20	3.90	5.20	4.40
AVG	0.48	0.49	0.58	1.00	1.00	1.00	0.93	0.91	0.97	2.23	3.57	3.12



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



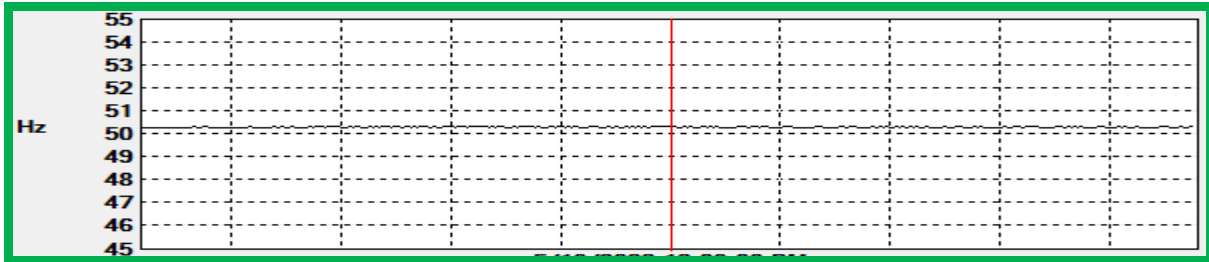
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.42	1.42	1.39	1.48	1.46
MAX	1.43	1.43	1.43	1.51	1.56	1.55
AVG	1.42	1.42	1.43	1.46	1.51	1.50

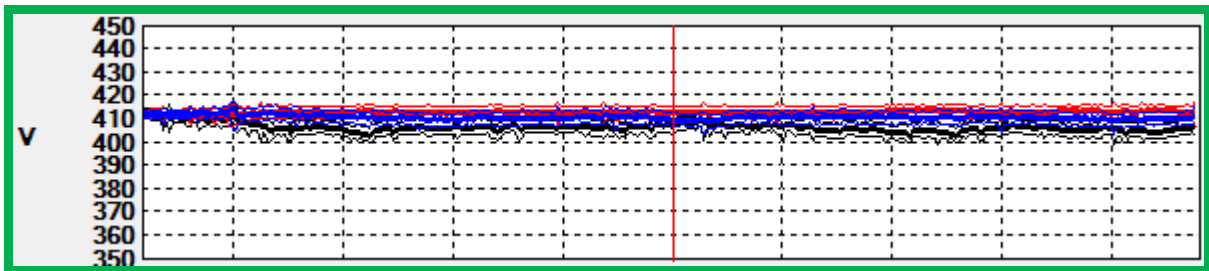


**A10-For-D. G Set 250 KVA (SS-D)**

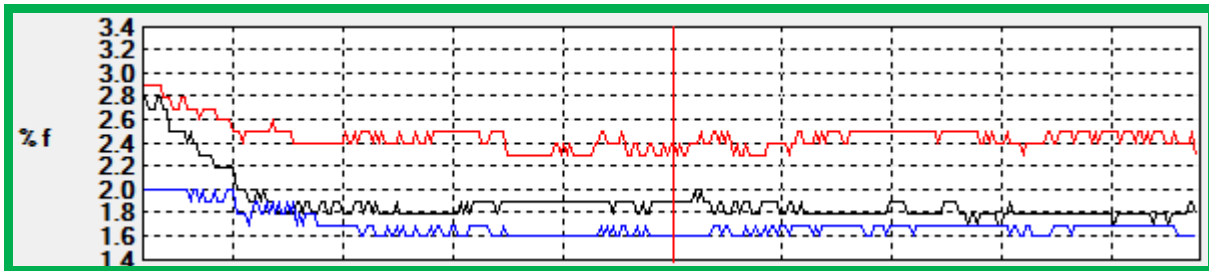
Frequency



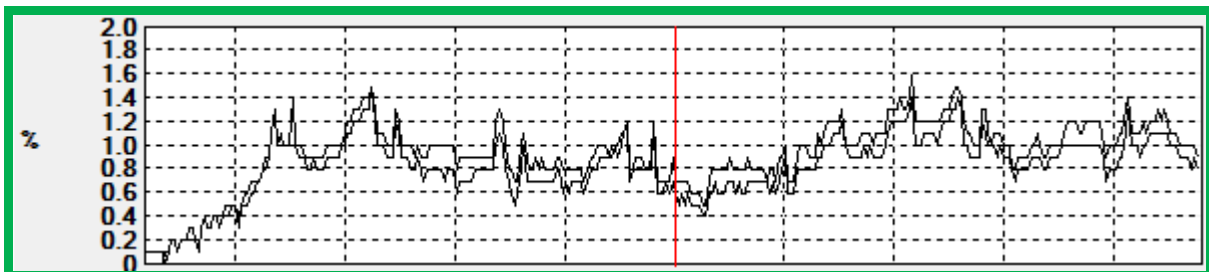
Voltage



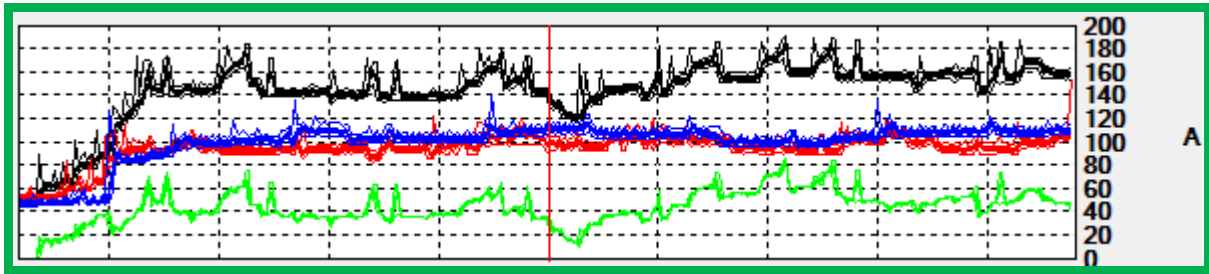
Voltage Harmonics



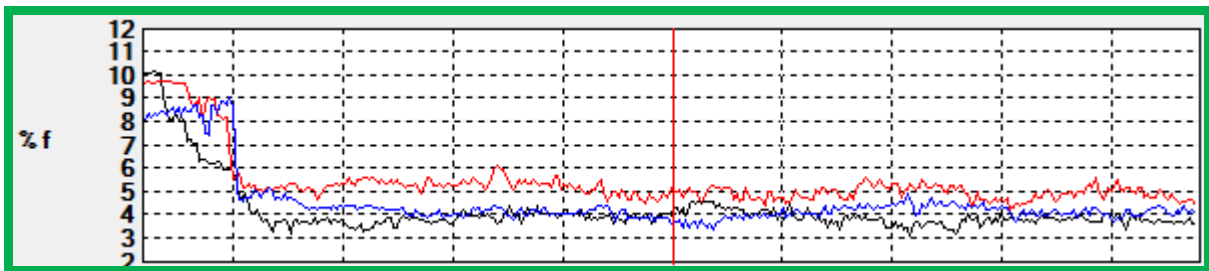
Voltage Un-balance



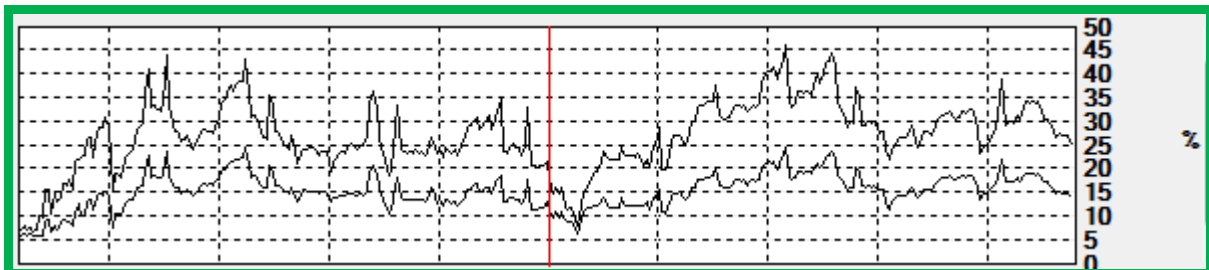
Current



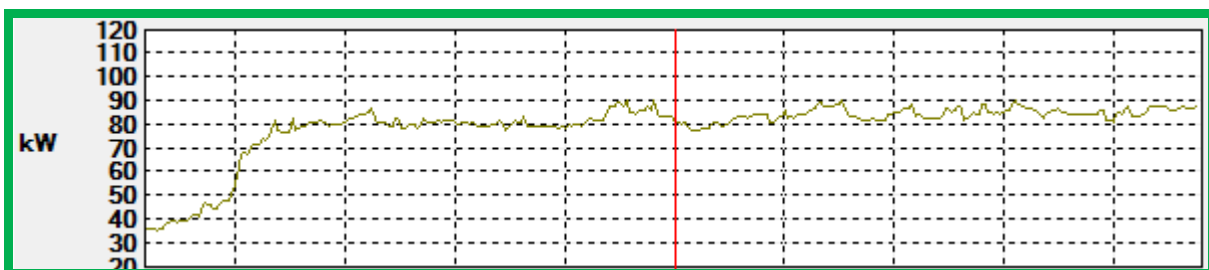
Current Harmonics



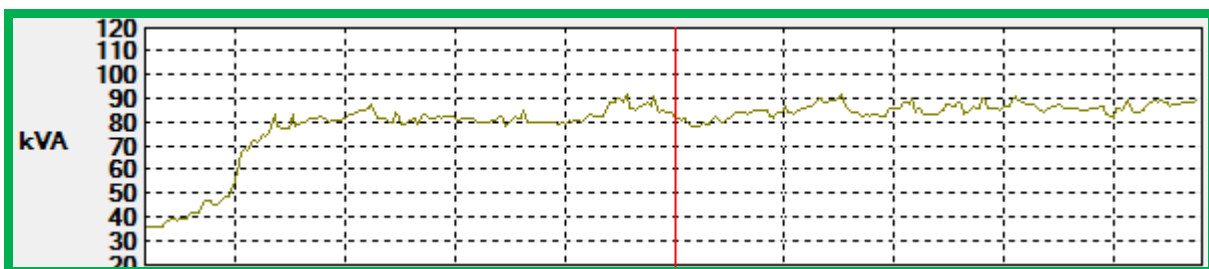
Current Un-balance



Power in KW



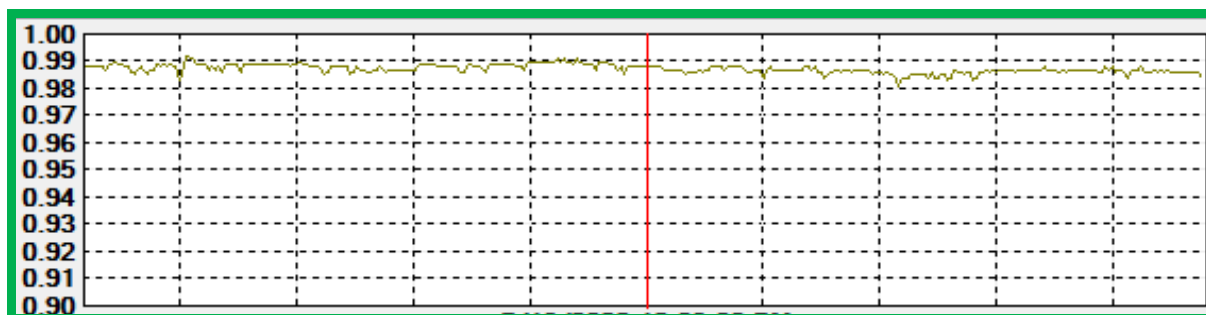
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	402.80	411.90	409.00	49.50	54.30	47.40	0.98	0.98	0.97	50.27	0.00	6.80
MAX	412.30	414.00	414.30	187.10	114.80	115.70	1.00	0.99	1.00	50.37	1.50	46.30
AVG	406.45	413.04	410.86	144.14	94.81	99.88	0.99	0.98	0.99	50.31	0.90	27.15

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	0.30	0.27	0.52	1.00	1.00	1.00	2.20	2.00	1.40	3.10	4.20	3.40
MAX	1.58	1.66	1.42	1.03	1.04	1.03	3.00	2.50	2.20	10.20	9.80	9.10
AVG	1.13	1.13	1.03	1.00	1.01	1.01	2.30	2.19	1.56	4.20	5.43	4.55



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



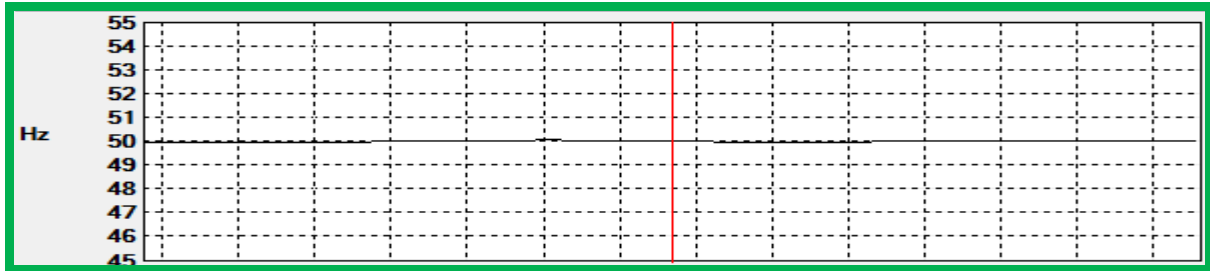
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.41	1.44	1.51	1.54	1.53
MAX	1.44	1.46	1.46	1.84	1.78	2.12
AVG	1.44	1.45	1.45	1.56	1.59	1.56

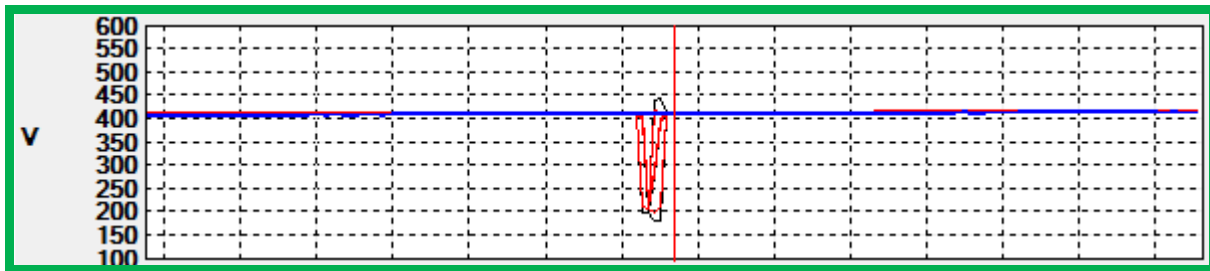


**B41-For-New Mass Communication Dept (SS-D)**

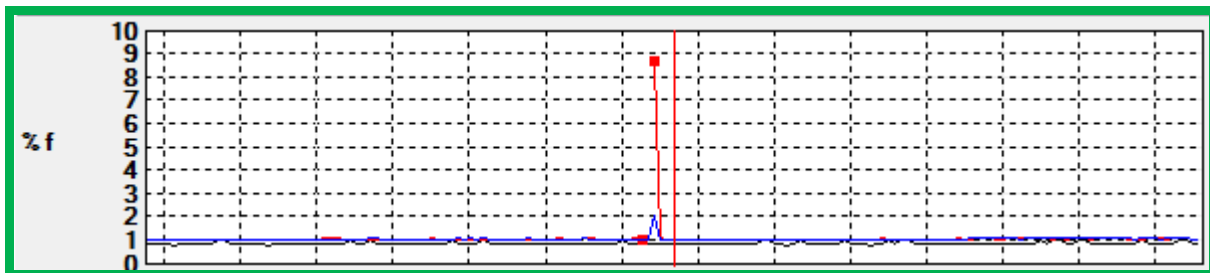
Frequency



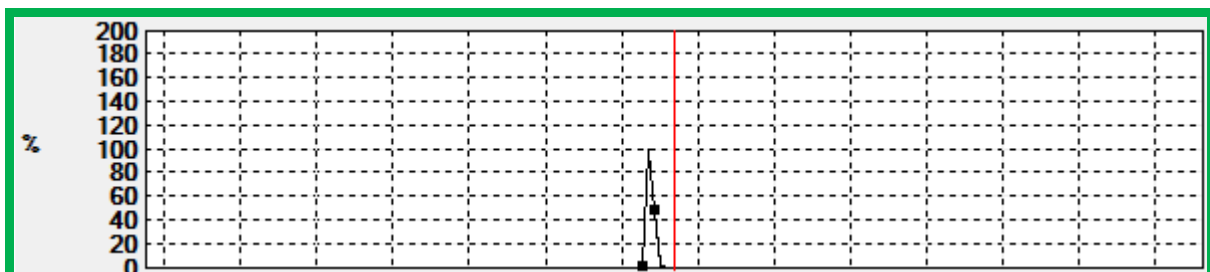
Voltage



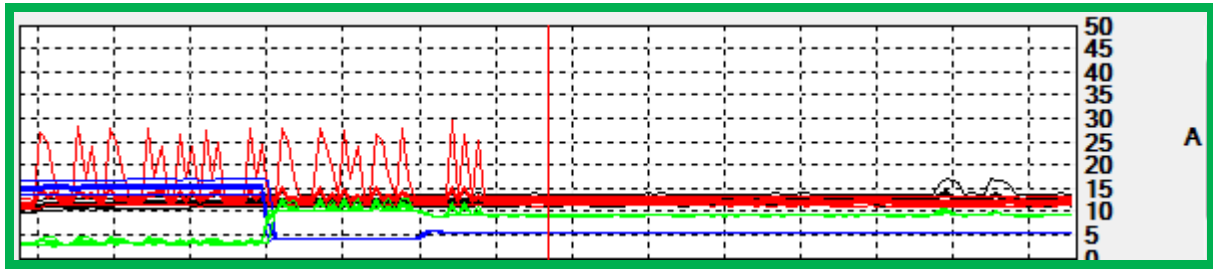
Voltage Harmonics



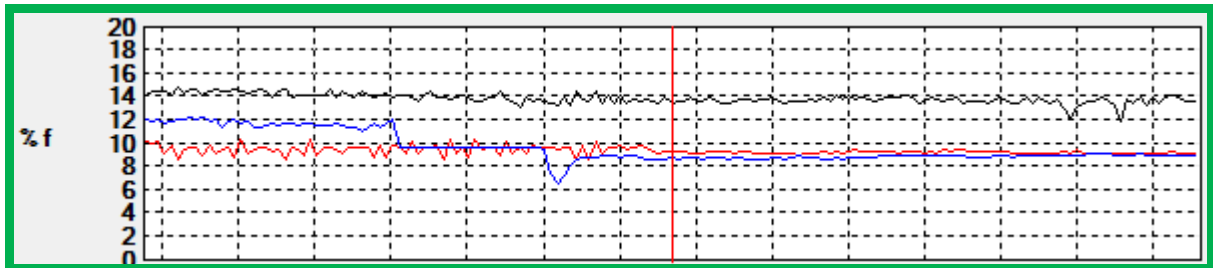
Voltage Un-balance



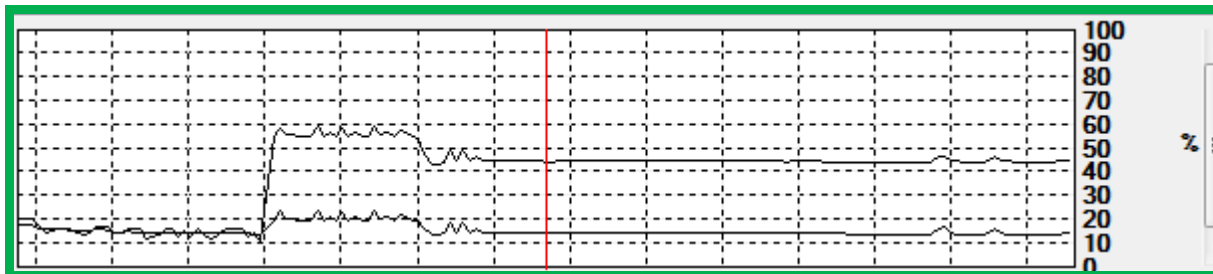
Current



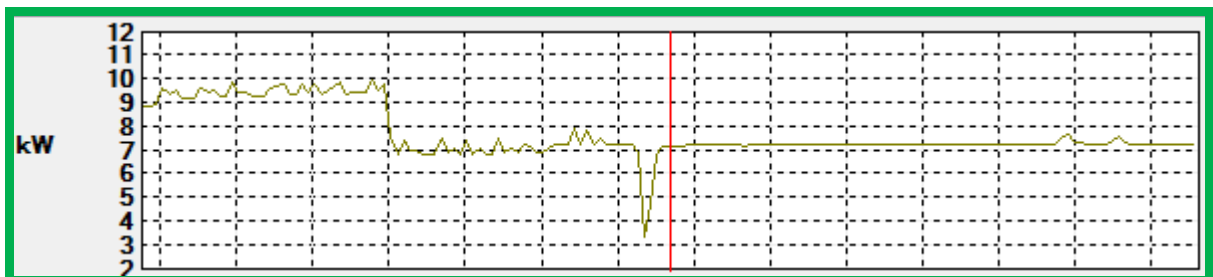
Current Harmonics



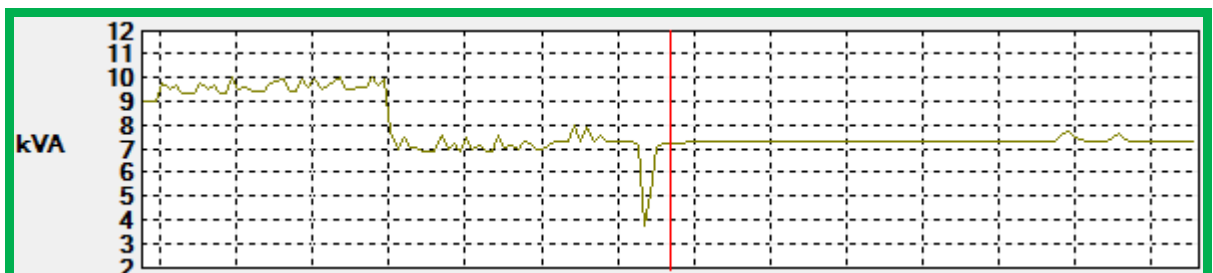
Current Un-balance



Power in KW

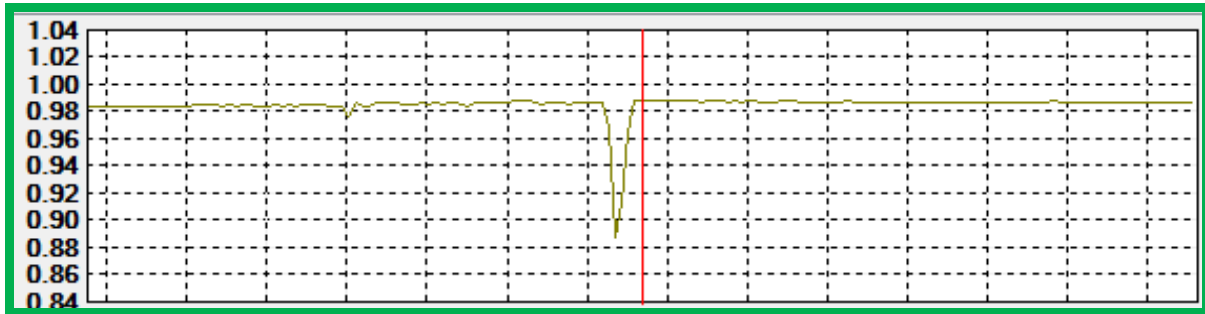


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	401.8	401.9	409.0	11.0	11.7	4.4	1.0	1.0	1.0	50.0	0.2	11.1
MAX	418.1	418.1	416.3	14.3	15.3	15.6	1.0	1.0	1.0	50.1	1.6	59.1
AVG	414.2	414.0	412.2	12.5	12.7	7.8	1.0	1.0	1.0	50.0	0.3	39.3

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.0	1.0	1.0	0.9	1.0	0.9	11.9	8.6	6.5
MAX	---	---	---	1.0	1.0	1.0	1.0	1.1	1.1	14.8	10.4	12.3
AVG	---	---	---	1.0	1.0	1.0	0.9	1.0	1.0	13.9	9.4	9.6



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



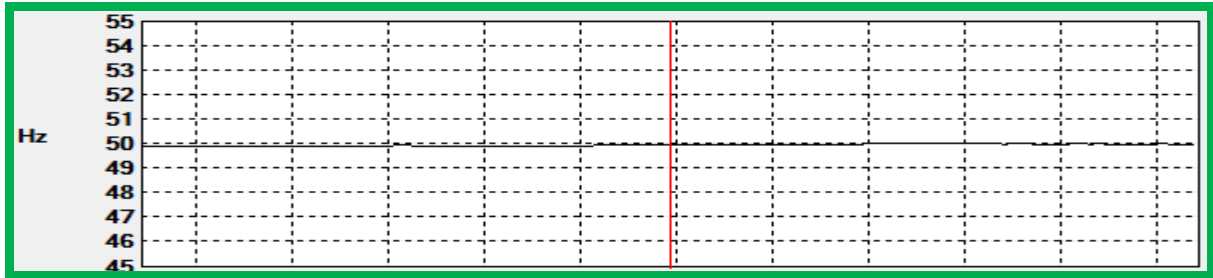
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.4	1.4	1.4	1.6	1.6	1.4
MAX	1.5	1.5	1.4	1.8	2.1	1.7
AVG	1.4	1.4	1.4	1.6	1.7	1.5

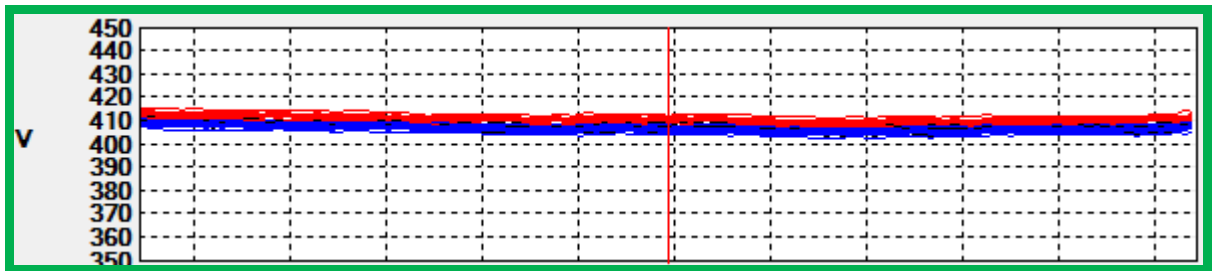


**B42-For-New Hindi Dept (SS-D)**

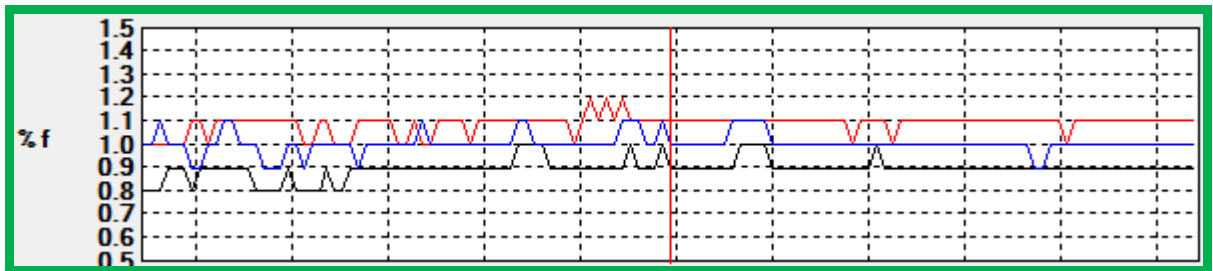
Frequency



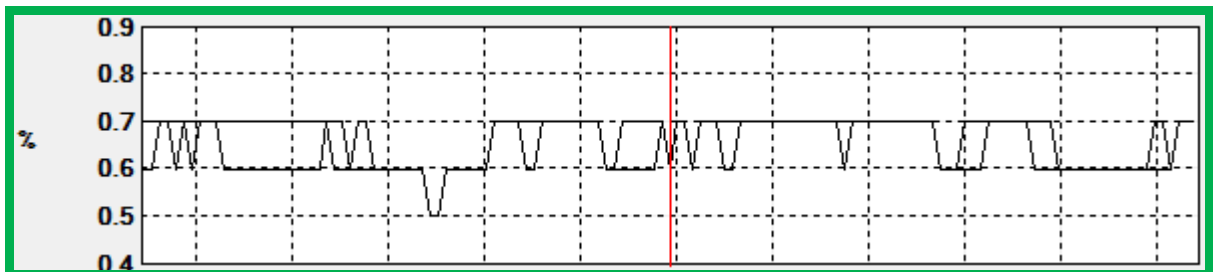
Voltage



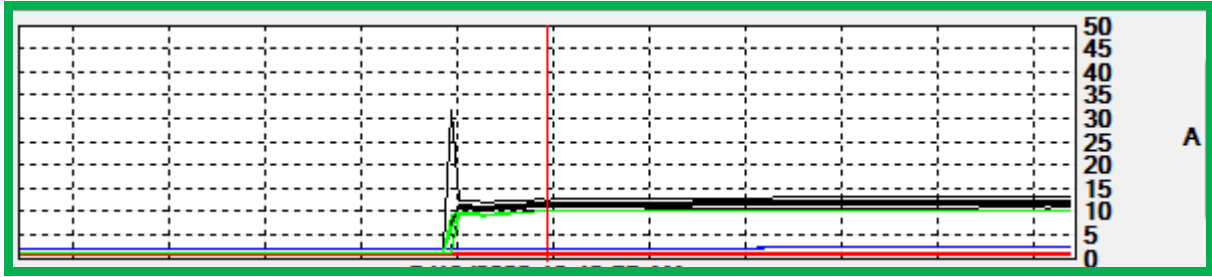
Voltage Harmonics



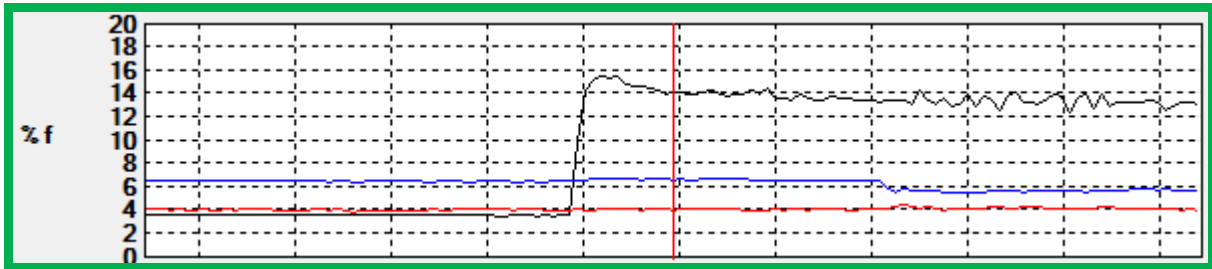
Voltage Un-balance



Current



Current Harmonics



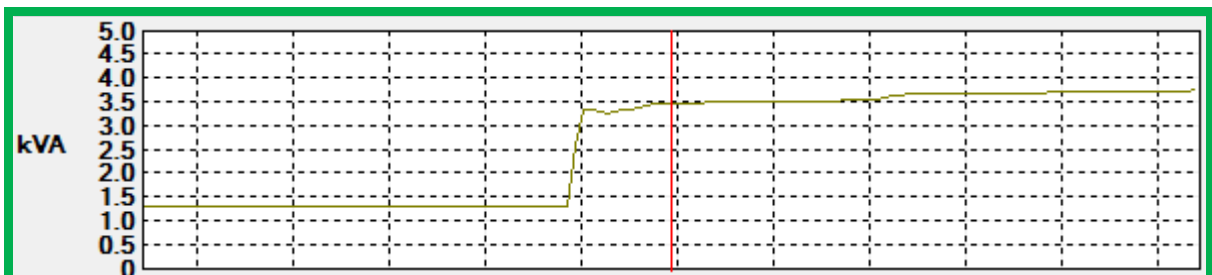
Current Un-balance



Power in KW



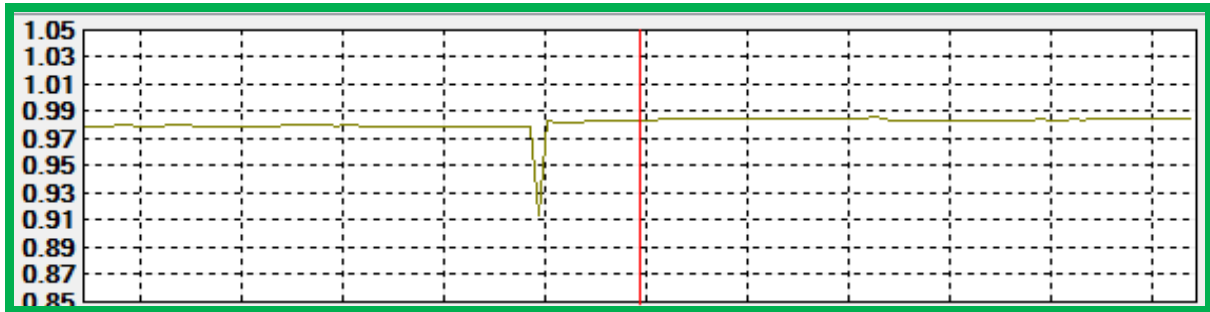
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb(IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	405.70	409.50	404.80	2.28	1.07	2.15	0.90	0.92	0.99	49.91	0.50	41.40
MAX	410.50	413.80	408.90	12.22	1.08	2.64	0.99	0.93	0.99	50.02	0.80	136.10
AVG	407.51	411.05	406.51	7.94	1.07	2.30	0.99	0.92	0.99	49.96	0.66	95.20

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	---	---	---	1.00	1.00	1.00	0.80	1.00	0.90	3.50	3.80	5.60
MAX	---	---	---	1.00	1.00	1.00	1.00	1.20	1.00	15.60	4.40	6.70
AVG	---	---	---	1.00	1.00	1.00	0.98	1.08	0.98	9.59	4.11	6.29



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



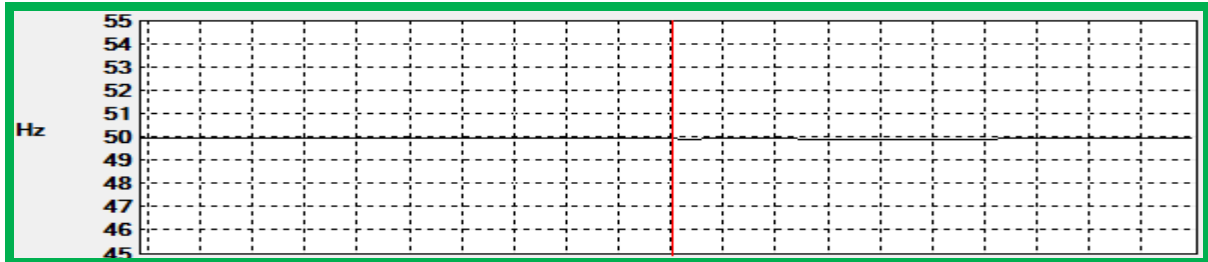
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.43	1.42	1.40	1.48	1.38
MAX	1.43	1.43	1.43	2.30	1.50	1.46
AVG	1.42	1.43	1.42	1.51	1.50	1.40

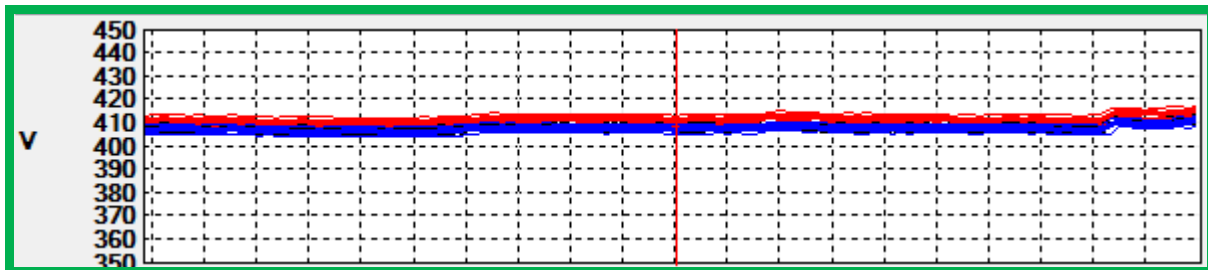


**B43-For-Zoology Dept. ground FLOOR (SS-D)**

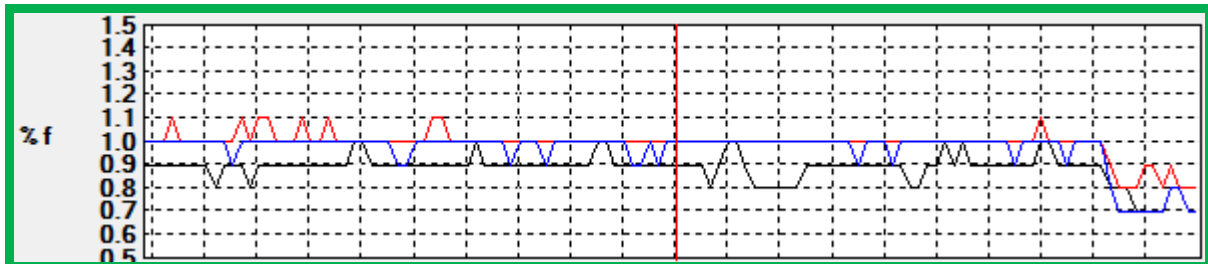
Frequency



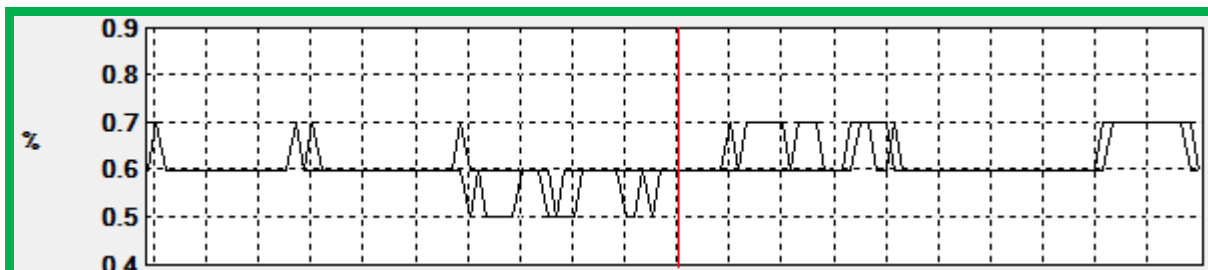
Voltage



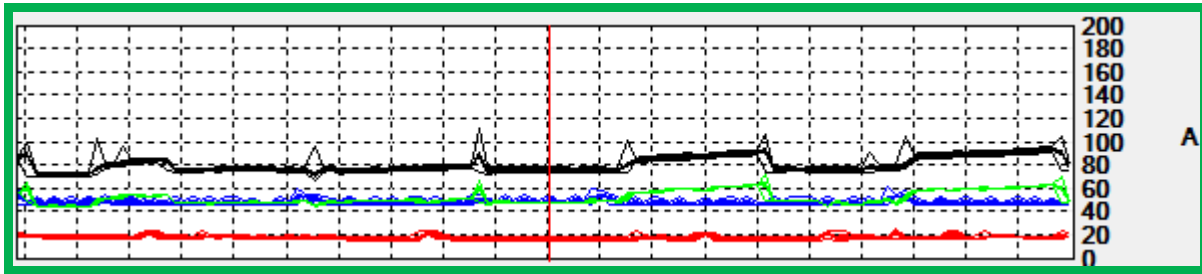
Voltage Harmonics



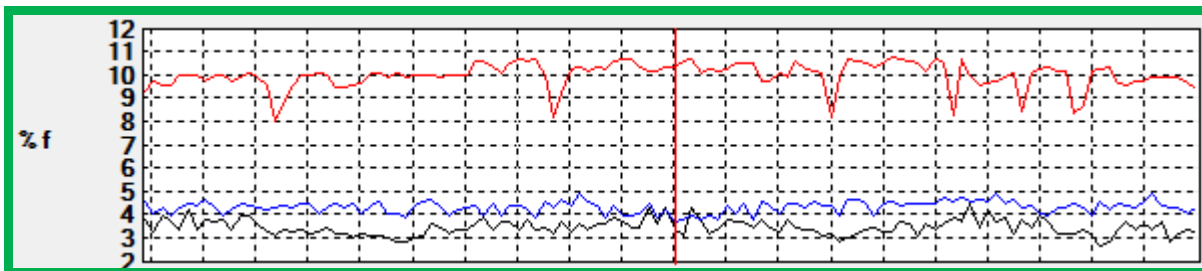
Voltage Un-balance



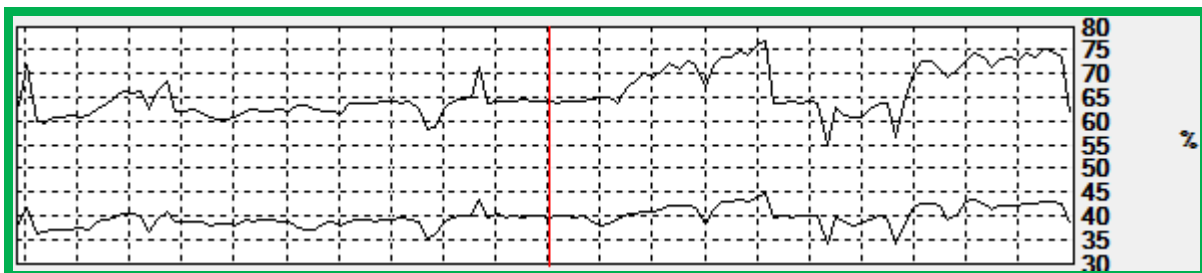
Current



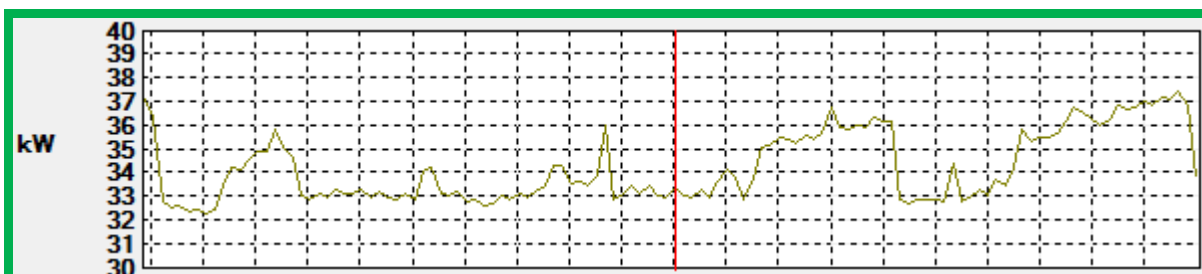
Current Harmonics



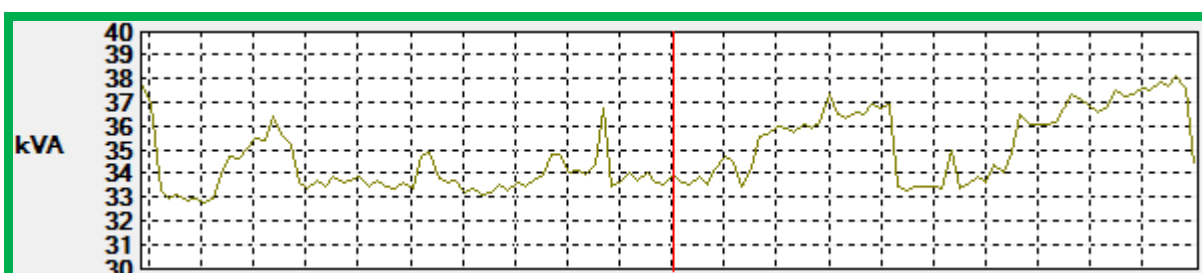
Current Un-balance



Power in KW

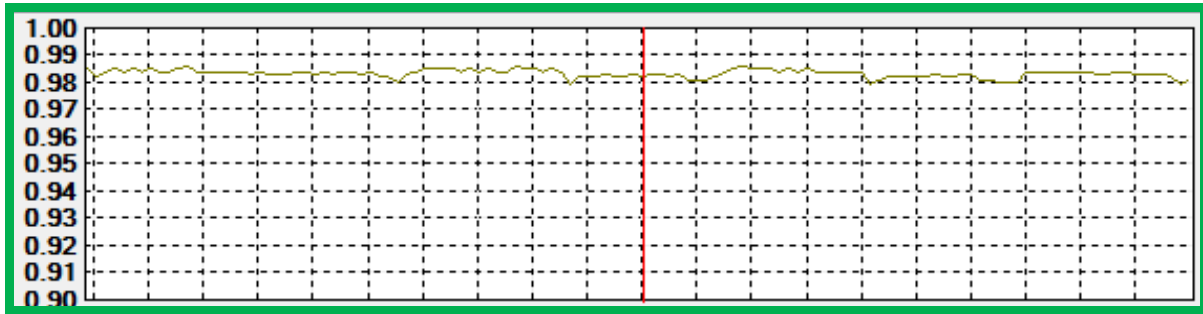


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	406.60	410.30	406.10	72.79	16.82	47.22	0.97	0.99	0.99	49.91	0.60	54.80
MAX	411.70	415.10	410.80	93.54	22.93	53.92	0.98	1.00	1.00	49.98	0.70	77.20
AVG	408.30	411.81	407.63	80.94	18.05	48.66	0.97	0.99	0.99	49.94	0.63	65.87

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.74	1.42	1.42	1.00	1.01	1.00	0.80	0.80	0.70	2.70	8.00	3.70
MAX	1.74	1.42	1.42	1.00	1.02	1.00	1.00	1.10	1.00	4.50	10.80	4.90
AVG	1.74	1.42	1.42	1.00	1.02	1.00	0.92	1.00	0.96	3.48	10.01	4.34



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



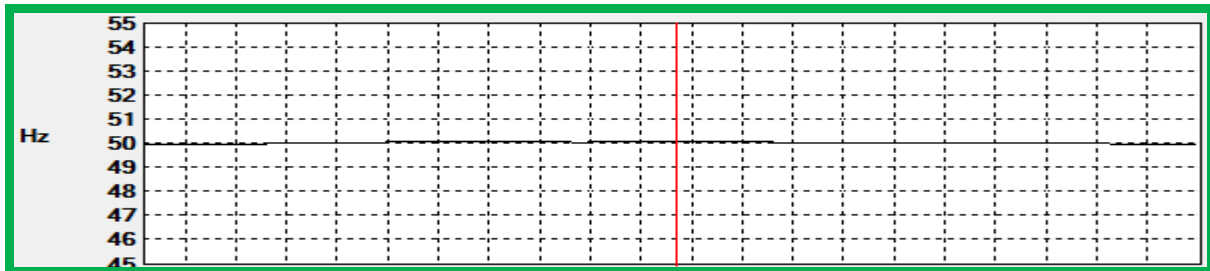
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.42	1.42	1.48	1.57	1.49
MAX	1.43	1.43	1.43	1.68	1.79	1.58
AVG	1.42	1.43	1.42	1.50	1.63	1.52

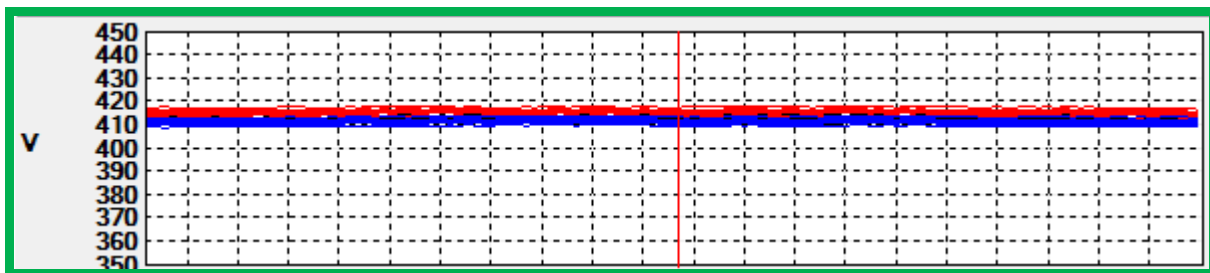


**B44-For-Sycology dept. (SS-D)**

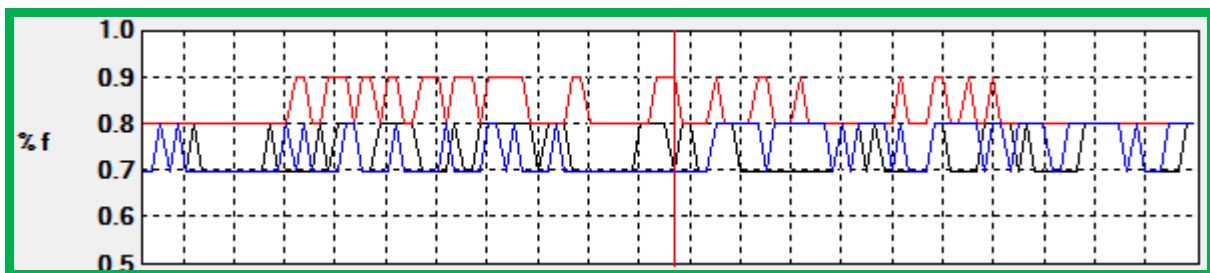
Frequency



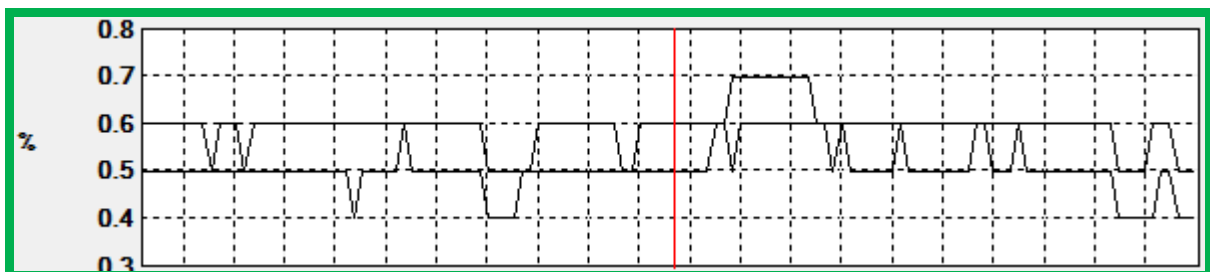
Voltage



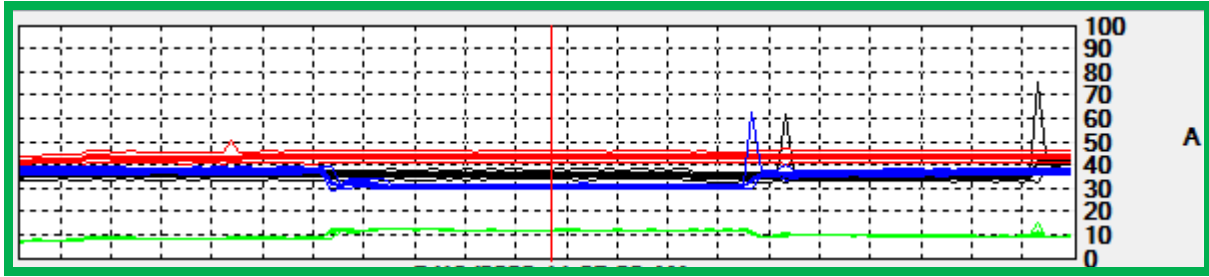
Voltage Harmonics



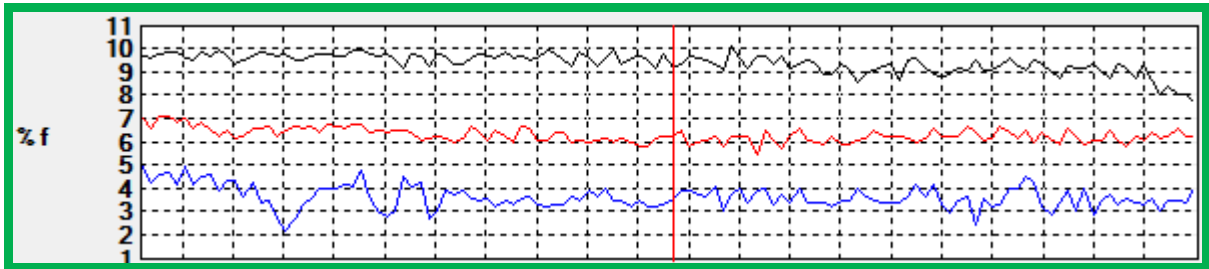
Voltage Un-balance



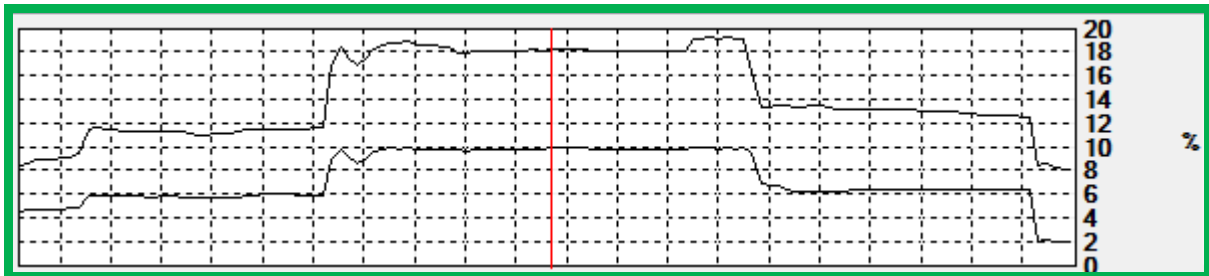
Current



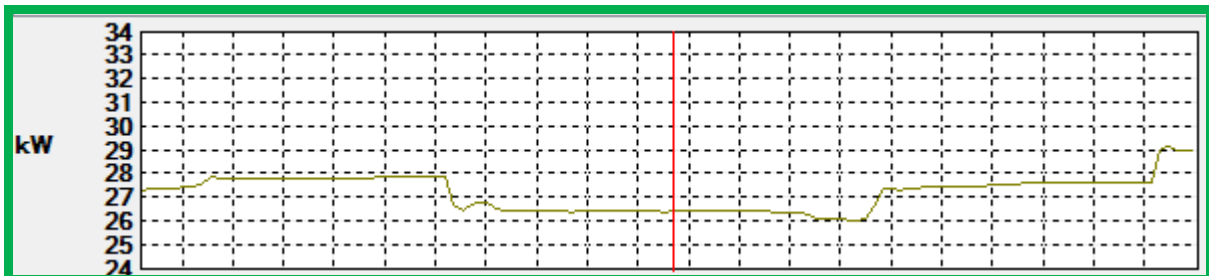
Current Harmonics



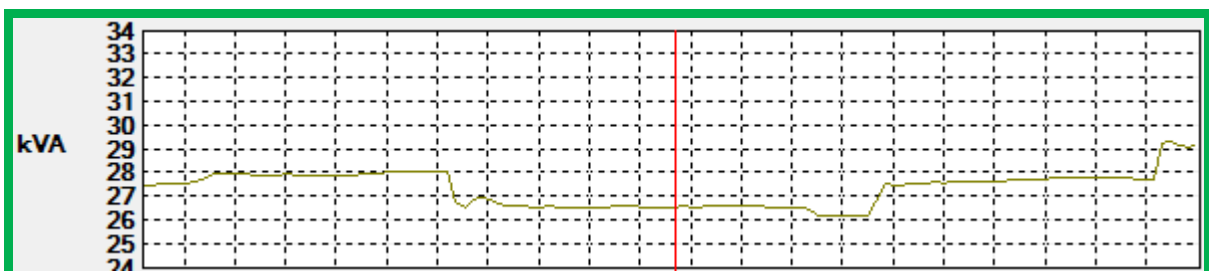
Current Un-balance



Power in KW



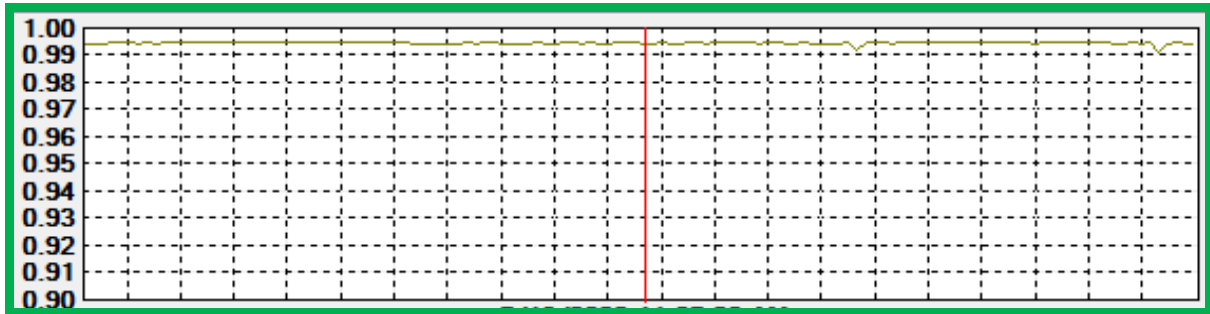
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	412.00	414.80	411.00	34.96	41.64	31.07	0.98	1.00	0.99	49.98	0.50	8.20
MAX	413.30	416.40	412.30	41.80	44.14	37.79	0.99	1.00	1.00	50.08	0.70	19.30
AVG	412.65	415.74	411.54	36.00	43.61	34.93	0.99	1.00	1.00	50.04	0.59	14.37

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.58	0.71	0.71	1.00	1.00	1.00	0.70	0.70	0.60	7.70	5.50	2.20
MAX	1.74	1.42	1.42	1.00	1.00	1.00	0.90	0.80	0.80	10.10	7.10	5.00
AVG	1.64	0.98	0.98	1.00	1.00	1.00	0.75	0.78	0.73	9.41	6.32	3.65



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



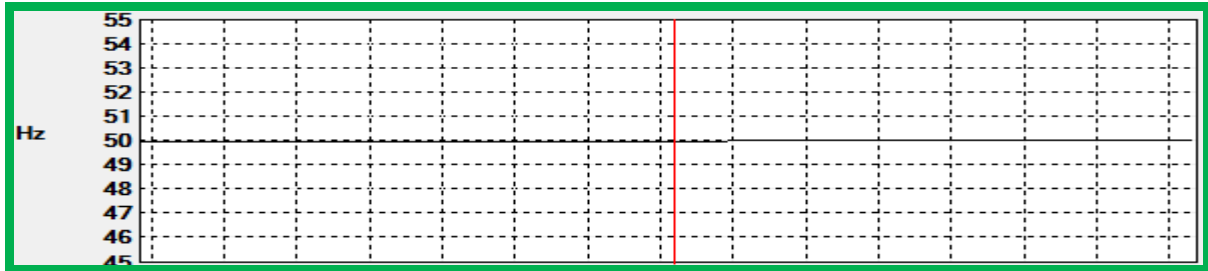
**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.42	1.42	1.55	1.52	1.45
MAX	1.42	1.43	1.42	1.89	1.78	1.63
AVG	1.42	1.42	1.42	1.59	1.53	1.47

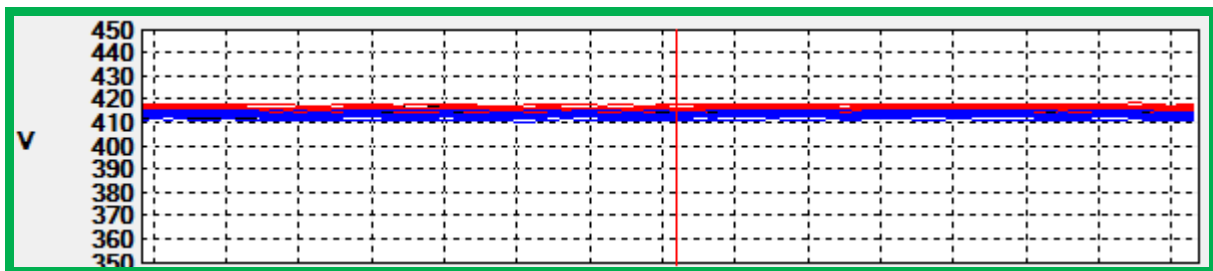


### B45-For-VSMP Hostel (SS-D)

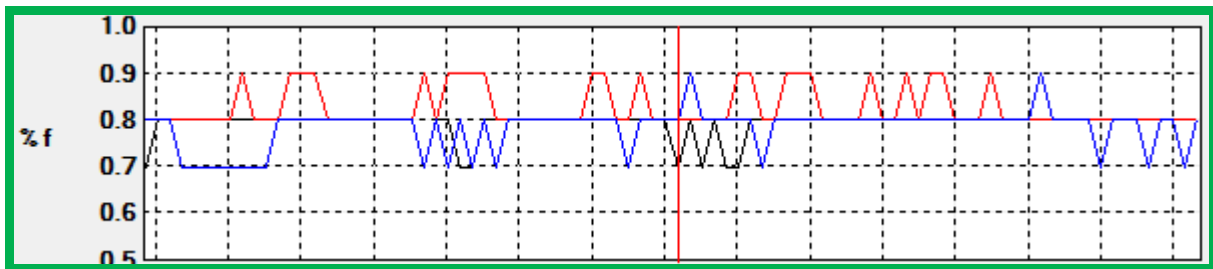
Frequency



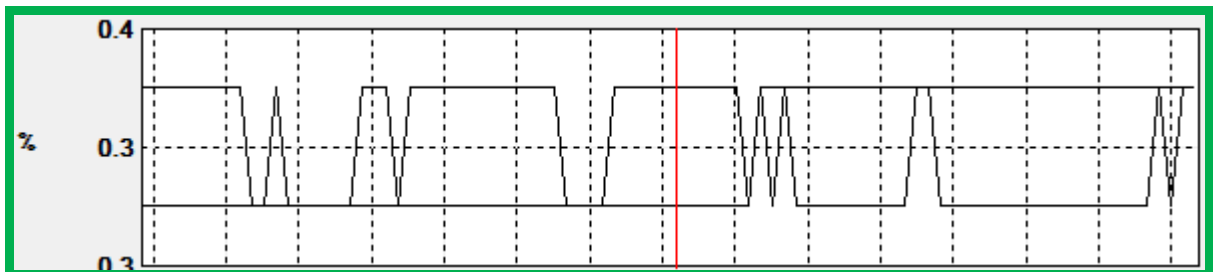
Voltage



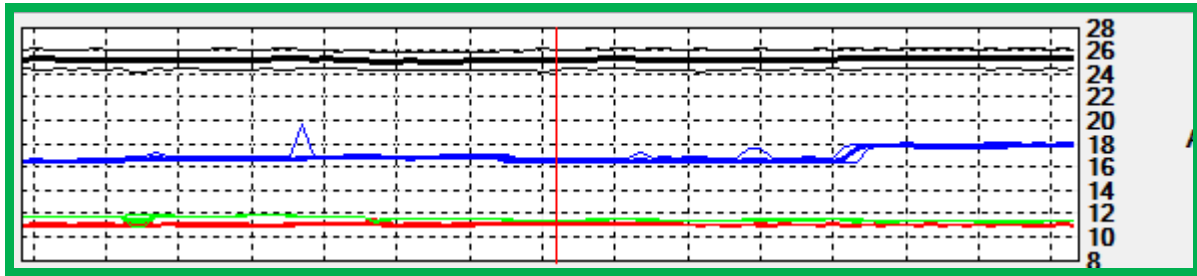
Voltage Harmonics



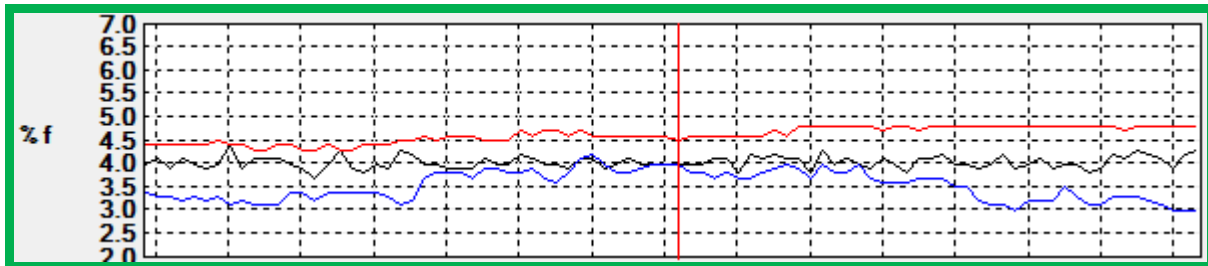
Voltage Un-balance



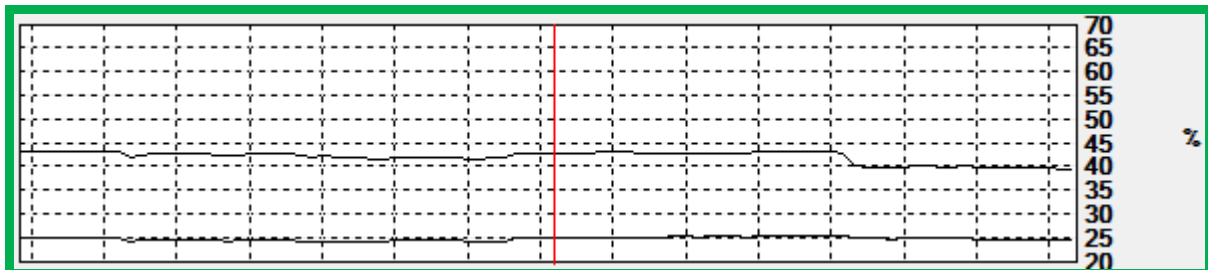
Current



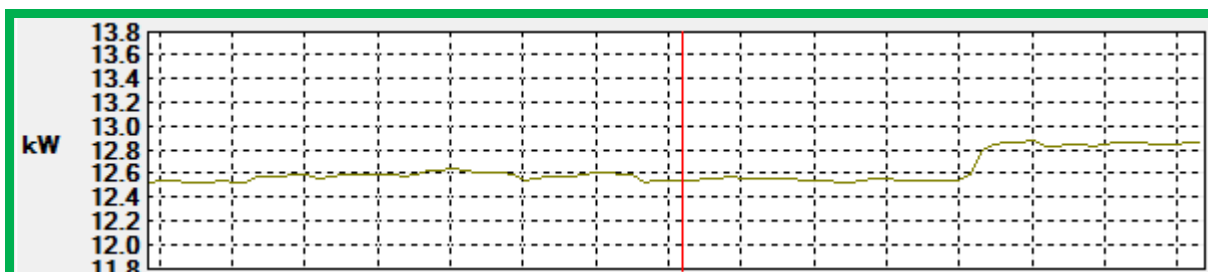
Current Harmonics



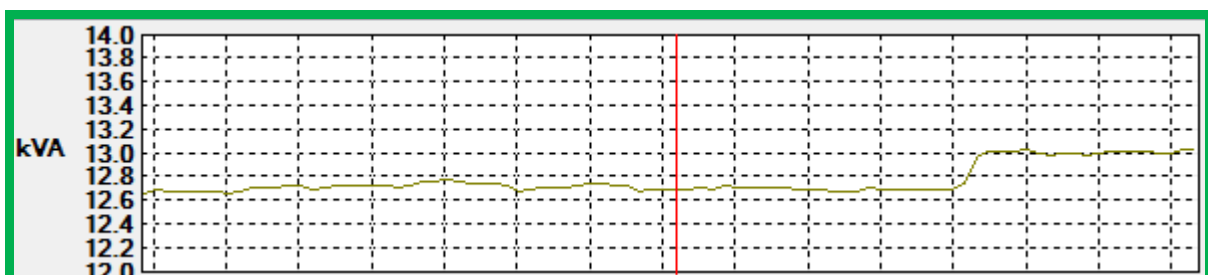
Current Un-balance



Power in KW

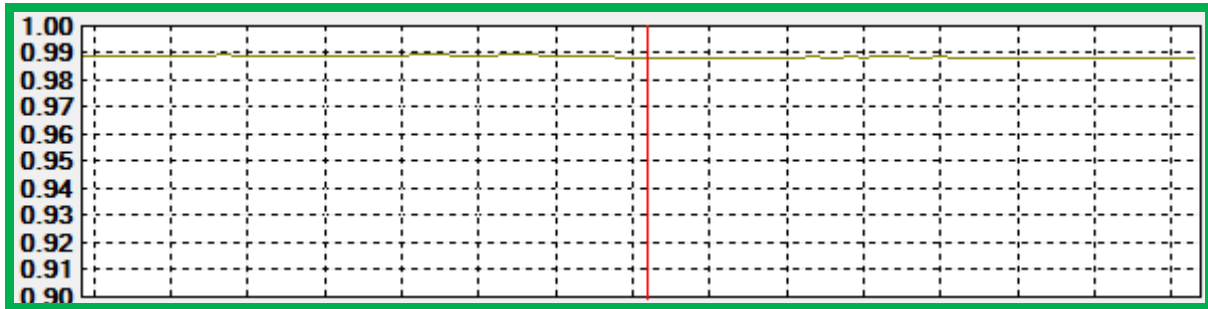


Power in KVA





Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Unb (IEEE 112)	Aunb (IEEE 112)
	V	V	V	A	A	A				Hz	%	%
MIN	414.10	415.40	412.60	25.12	11.04	16.55	0.99	1.00	0.98	49.94	0.30	39.60
MAX	415.30	416.60	413.70	25.40	11.26	18.02	0.99	1.00	0.99	50.04	0.40	43.40
AVG	414.73	416.07	413.31	25.28	11.12	16.98	0.99	1.00	0.98	49.99	0.36	42.13

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	1.58	0.71	0.71	1.00	1.00	1.00	0.70	0.70	0.70	3.70	4.30	3.00
MAX	1.58	0.71	0.71	1.00	1.00	1.00	0.90	0.90	0.80	4.40	4.80	4.20
AVG	1.58	0.71	0.71	1.00	1.00	1.00	0.80	0.81	0.78	4.03	4.62	3.53



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.42	1.42	1.49	1.40	1.49
MAX	1.42	1.43	1.42	1.50	1.45	1.85
AVG	1.42	1.43	1.42	1.49	1.42	1.52

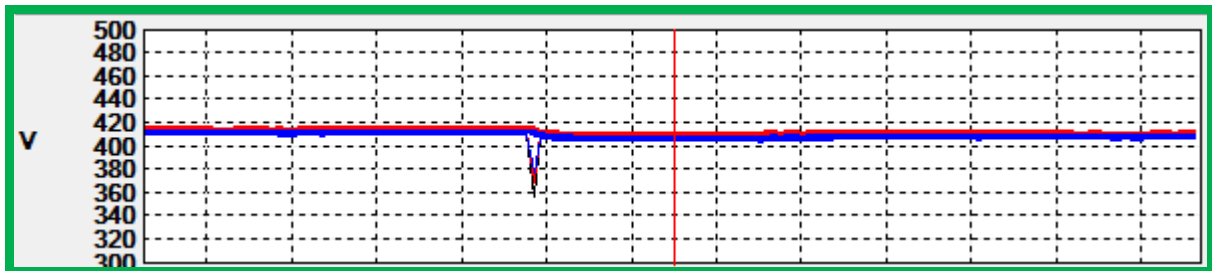


**B46-For-Pt. Deendayal Upadhyay Hostel (SS-D)**

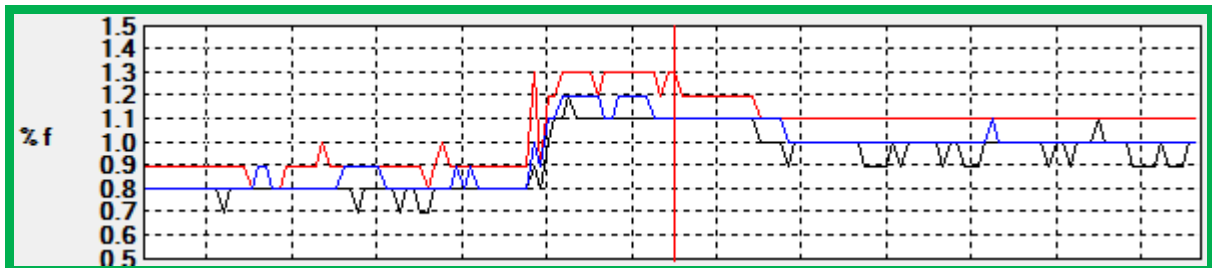
Frequency



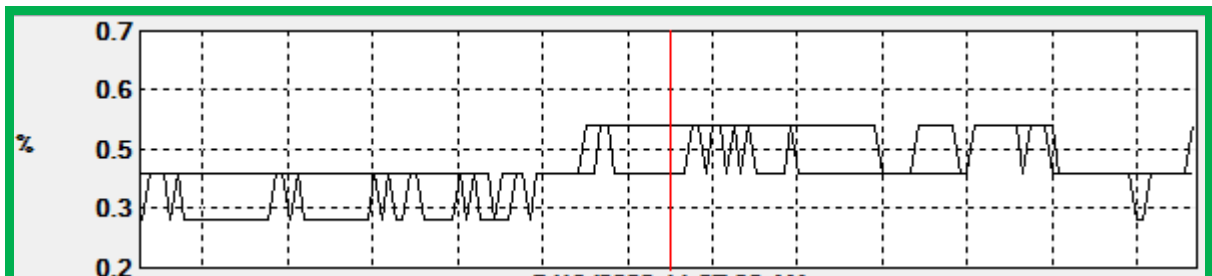
Voltage



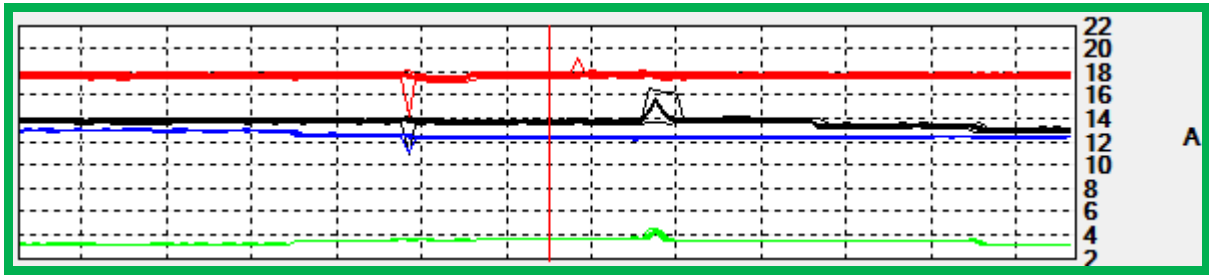
Voltage Harmonics



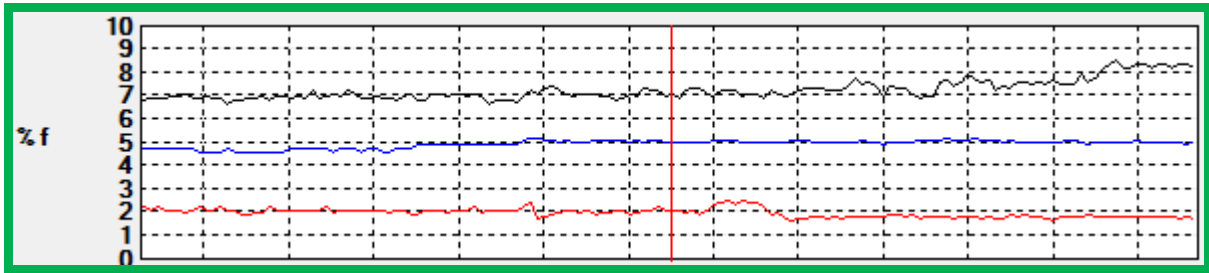
Voltage Un-balance



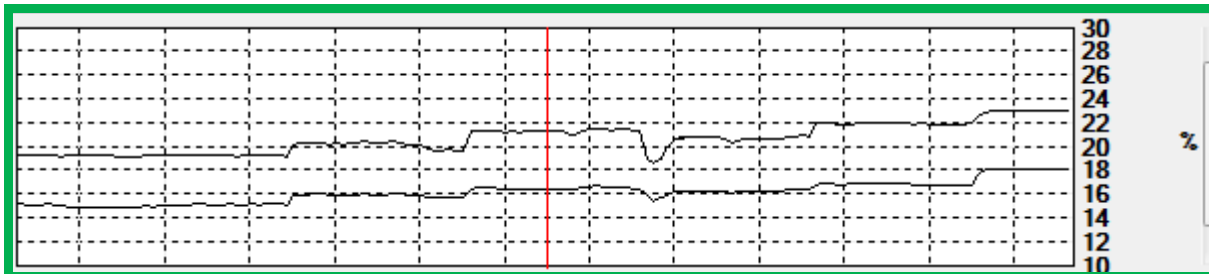
Current



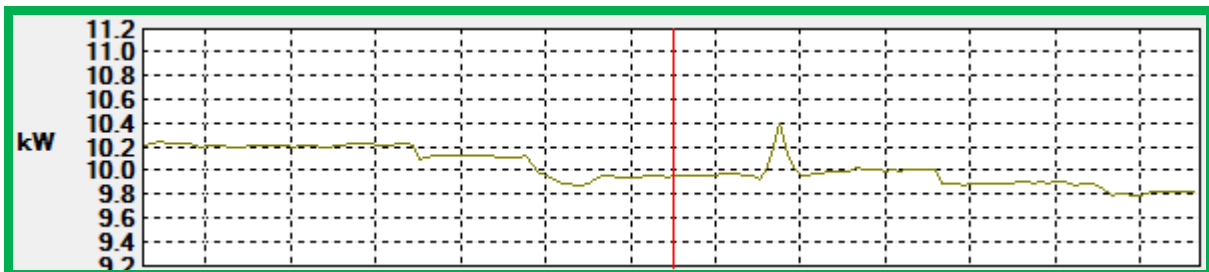
Current Harmonics



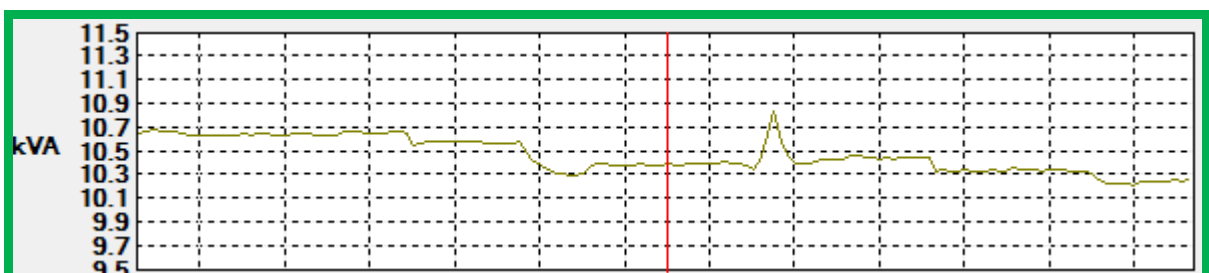
Current Un-balance



Power in KW



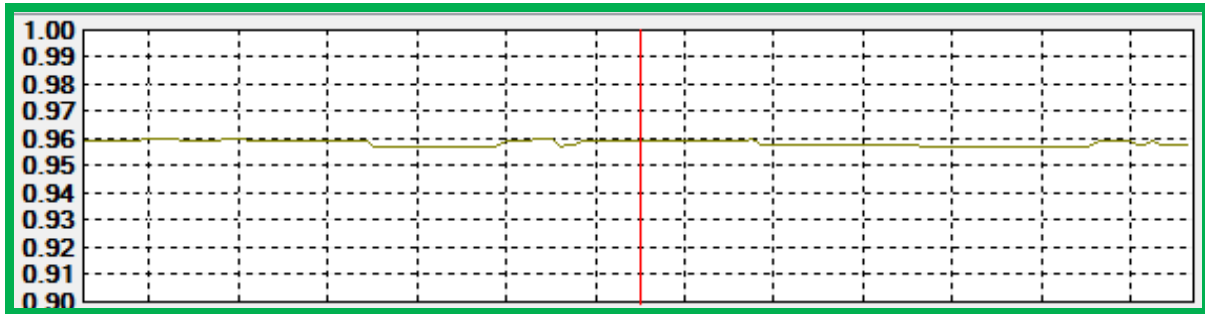
Power in KVA







Power Factor



Min, Average & Max Rang of Voltage, Current, Frequency & Un-balance

Value:	U12 rms	U23 rms	U31 rms	A1 rms	A2 rms	A3 rms	PF1	PF2	PF3	F	Uunb (IEE E 112)	Aunb(IEE E 112)
	V	V	V	A	A	A				Hz	%	%
MIN	407.20	409.30	405.60	13.03	17.39	12.38	0.98	0.97	0.98	49.94	0.30	18.60
MAX	413.70	415.40	412.40	15.57	17.85	13.09	0.98	0.98	0.98	50.07	0.50	23.10
AVG	410.77	412.46	409.34	13.72	17.74	12.63	0.98	0.98	0.98	50.01	0.40	20.73

Min, Average & Max Rang of Flickering, "K" Factor & Harmonics

Value:	Pst1	Pst2	Pst3	FK1	FK2	FK3	U12THDf	U23THDf	U31THDf	A1THDf	A2THDf	A3THDf
							% f	% f	% f	% f	% f	% f
MIN	4.43	3.05	2.75	1.00	1.00	1.00	0.70	0.80	0.70	6.60	1.60	4.60
MAX	4.43	3.05	2.75	1.01	1.00	1.00	1.30	1.20	1.20	8.50	2.50	5.20
AVG	4.43	3.05	2.75	1.01	1.00	1.00	0.96	1.00	0.96	7.25	1.97	4.93



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



**Crest Factor**

Value:	U12 CF	U23 CF	U31 CF	A1 CF	A2 CF	A3 CF
MIN	1.42	1.42	1.42	1.62	1.45	1.36
MAX	1.43	1.43	1.42	1.84	1.58	1.38
AVG	1.42	1.42	1.42	1.65	1.46	1.37



Many problems can arise from harmonic currents in a power system. Some problems are easy to detect; others exist and persist because harmonics are not suspected. Higher RMS current and voltage in the system are caused by harmonic currents, which can result in any of the problems listed below:

Cause	Effect
Blinking of Incandescent Lights	Transformer Saturation
Capacitor Failure	Harmonic Resonance
Circuit Breakers Tripping	Inductive Heating and Overload
Conductor Failure	Inductive Heating
Electronic Equipment Shutting down	Voltage Distortion
Flickering of Fluorescent Lights	Transformer Saturation
Fuses Blowing for No Apparent Reason	Inductive Heating and Overload
Motor Failures (overheating)	Voltage Drop
Neutral Conductor and Terminal Failures	Additive Triplen Currents
Electromagnetic Load Failures	Inductive Heating
Overheating of Metal Enclosures	Inductive Heating
Power Interference on Voice Communication	Harmonic Noise
Transformer Failures	Inductive Heating



## 11. STUDY OF D.G. SETS

Brief description of existing system and its operation

The CCS University Meerut has installed 10 nos. of D.G. sets of different capacity like, 180 KVA, 250 KVA, 320 KVA, and 380 KVA at different location of the campus for power cut and self-generation.

During the study team was check the fuel efficiency each D.G. sets and tabulated below.

### Rated Specification:

#### At Substation A

Particulars	D.G#1	D.G#2	D.G#3
Make	CUMMINS	CUMMINS/Kirloskar	CUMMINS
Rating	320KVA	180KVA	250KVA
Voltage	415	415	415
Current	445	250	347.5
KW	256	200	200
KVA	320	180	250
PF	0.80	0.80	0.80
RPM	1500	1500	1500

#### At Substation B

Particulars	D.G#1	D.G#2	D.G#3
Make	CUMMINS	CUMMINS/Kirloskar	CUMMINS
Rating	380KVA	180KVA	400KVA
Voltage	415	415	415
Current	529	250	556



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Particulars	D.G#1	D.G#2	D.G#3
KW	304	200	320
KVA	380	180	400
PF	0.80	0.80	0.80
RPM	1500	1500	1500

**At Substation C**

Particulars	D.G#1
Make	CUMMINS
Rating	380KVA
Voltage	415
Current	529
KW	304
KVA	380
PF	0.80
RPM	1500

**At Substation D**

Particulars	D.G#1
Make	Kirloskar Greens
Rating	250KVA
Voltage	415
Current	347.5



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Particulars	D.G#1
KW	200
KVA	250
PF	0.80
RPM	1500

**Measurement & Observation:**

- DG set at S/S- B

380 KVA, DG 1	
PARAMETERS	OBSERVATIONS
Capacity Of Generator Set, Make and Other Details	380 KVA, Cummins / Stamford
	415 V, I: -529, PF: -0.80, KW: -304
Fuel Used	HSD
Trial Duration	0.66 HR.
Units Generated By (Our Calibrated Meter)	141.35 KWh
Fuel Consumed	36 LTRs
% Loading (As Per KW.)	69.74%
Power Quality	%THDV :1.10% THDI :4.00 %
Frequency	50 HZ
Specific Fuel Consumption	3.92 UNITS/Ltr
Electrical Parameters	Refer Graphs



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Cost Of HSD	Rs.95 /UNIT (APPROX.)
Cost Per Unit	Rs.24.23 / UNIT
<b>180 KVA, DG 2</b>	
<b>PARAMETERS</b>	<b>OBSERVATIONS</b>
Capacity Of Generator Set, Make and Other Details	180 KVA, Cummins/Kirloskar
	415 V, I: -250, PF: -0.80, KW: -144
Fuel Used	HSD
Trial Duration	0.66 HR.
Units Generated By (Our Calibrated Meter)	22.45 KWh
Fuel Consumed	12 LTRs
% Loading (As Per Kw.)	23.37%
Power Quality	%THDV :1.00% THDI :8.30 %
Frequency	50 HZ
Specific Fuel Consumption	1.87 UNITS/Ltr
Electrical Parameters	Refer Graphs
Cost Of Hsd	Rs.95 /UNIT (APPROX.)
Cost Per Unit	Rs.50.80/- UNIT

**400 KVA, DG 3, Kendriya Mulyankan Bhawan**

<b>PARAMETERS</b>	<b>OBSERVATIONS</b>
Capacity Of Generator Set, Make and Other	400 KVA, Cummins/Stamford



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Details	415 V, I:-556, PF:-0.80, KW:-320
Fuel Used	HSD
Trial Duration	1/2 HR.
Units Generated By (Our Calibrated Meter)	42.30 KWh
Fuel Consumed	16.92 LTRs
% Loading (As Per KW.)	26.44%
Power Quality	%THDV :1.50% THDI :15 %
Frequency	50 HZ
Specific Fuel Consumption	2.5 UNITS/Ltr
Electrical Parameters	Refer Graphs
Cost Of HSD	Rs.95 /UNIT (APPROX.)
Cost Per Unit	Rs.38/- UNIT

- **DG sets at SS-C**

380 KVA, DG 1	
PARAMETERS	OBSERVATIONS
Capacity Of Generator Set, Make and Other Details	380 KVA, Cummins / Stamford
	415 V, I: - 529, PF: - 0.80, KW: - 304
Fuel Used	HSD
Trial Duration	1/2 HR.
Units Generated By	44 KWh





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



(Our Calibrated Meter)	
Fuel Consumed	12 LTRs
% Loading (As Per KW.)	28.94%
Power Quality	%THDV :1.60 % THDI :13 %
Frequency	50 HZ
Specific Fuel Consumption	3.00 UNITS/Ltr
Electrical Parameters	Refer Graphs
Cost Of HSD	Rs.95 /UNIT (APPROX.)
Cost Per Unit	Rs.31.66 /- UNIT

- **DG sets Data SS-A**

320 KVA, DG 1	
PARAMETERS	OBSERVATIONS
Capacity Of Generator Set, Make And Other Details	320 KVA, Cummins / Stamford
	415 V, I:-445, PF:-0.80, KW:-256
Fuel Used	HSD
Trial Duration	1/2 HR.
Units Generated By	58.29 KWh
(Our Calibrated Meter)	
Fuel Consumed	20 LTRs
% Loading (As Per KW.)	45.53%



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Power Quality	%THDV :2.00% THDI :7.5%
Frequency	50 HZ
Specific Fuel Consumption	2.91 UNITS/Ltr
Electrical Parameters	Refer Graphs
Cost Of HSD	Rs.95 /UNIT (APPROX.)
Cost Per Unit	Rs.32.64/- UNIT

180 KVA, No.2	
PARAMETERS	OBSERVATIONS
Capacity Of Generator Set, Make and Other Details	180 KVA, Cummins/Kirloskar
	415 V, I:-250, PF:-0.80, KW:-144
Fuel Used	HSD
Trial Duration	1/2 HR.
Units Generated By	44.93 KWh
(Our Calibrated Meter)	
Fuel Consumed	15 LTRs
% Loading (As Per KW.)	62.40%
Power Quality	%THDV :1.50% THDI :12 %
Frequency	50 HZ
Specific Fuel Consumption	2.99 UNITS/Ltr



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ENERGY AUDIT

Rev 0

28-05-2022



Electrical Parameters	Refer Graphs
Cost Of HSD	Rs.95 /UNIT (APPROX.)
Cost Per Unit	Rs.31.77/- UNIT

250 KVA, DG 3, Kendriya Mulyankan Bhawan	
PARAMETERS	OBSERVATIONS
Capacity Of Generator Set, Make and Other Details	250 KVA, Cummins/stamford
	415 V, I:-347.5, PF:-0.80, KW:-200
Fuel Used	HSD
Trial Duration	1/2 HR.
Units Generated By (Our Calibrated Meter)	71.26 KWh
Fuel Consumed	20 LTRs
% Loading (As Per KW.)	71.26%
Power Quality	%THDV :2.00% THDI :8.00 %
Frequency	50 HZ
Specific Fuel Consumption	3.56 UNITS/Ltr
Electrical Parameters	Refer Graphs
Cost Of HSD	Rs.95 /UNIT (APPROX.)
Cost Per Unit	Rs.26.68/- UNIT

- **DG sets Data SS-D**



**250 KVA DG set 1**

PARAMETERS	OBSERVATIONS
Capacity Of Generator Set, Make and Other Details	250 KVA, Kirloskar Green
	415 V, I:-347.5, PF:-0.80, KW:-200
Fuel Used	HSD
Trial Duration	1/2 HR.
Units Generated By (Our Calibrated Meter)	38.30 KWh
Fuel Consumed	16 LTRs
% Loading (As Per KW.)	38.39%
Power Quality	%THDV :2.00% THDI :5 %
Frequency	50 HZ
Specific Fuel Consumption	2.4 UNITS/Ltr
Electrical Parameters	Refer Graphs
Cost Of HSD	Rs.95 /UNIT (APPROX.)
Cost Per Unit	Rs.39.58/- UNIT

Remarks

- On behalf of above study, it was observed that the voltage level of D.G. set No.1, 320 KVA was running on higher side i.e., 443 Voltage to 448 Voltage. It is suggested take corrective action to control the voltage level from existing level to 420 Voltage.
- It is suggested that proper log sheets (sample enclosed as Annexure-1) may be maintained for each DG Sets. This would help to evaluate the performance of each DG Sets on a periodic basis.



## 12. STUDY OF WATER PUMPS

With the installed pumps data, the actual efficiency of the pump has been calculated. In order to assess the performance of pumps, the operating efficiencies were evaluated. In order to evaluate the pumps operating efficiency, online flow was measured with the help of ultrasonic flow meter, pump head was measured with the help of pressure gauges at suction and discharge lines, and pumps motor power were measured using calibrated power analyzer.

The performance of the pumps evaluated during the energy audit is given below:

Old Overhead tank			New Overhead (Rajesh Pilot)		
Voltage (Volts)			Voltage (Volts)		
	"R" Phase	230.0		"R" Phase	222.8
	"Y" Phase	226.0		"Y" Phase	222.8
	"B" Phase	235.0		"B" Phase	221.7
Current (Amps)			Current (Amps)		
	"R" Phase	46		"R" Phase	43
	"Y" Phase	56		"Y" Phase	37
	"B" Phase	46		"B" Phase	41
Power Factor			Power Factor		
	"R" Phase	0.67		"R" Phase	0.84
	"Y" Phase	0.77		"Y" Phase	0.91
	"B" Phase	0.83		"B" Phase	0.91
Power Drawn (KW)			Power Drawn (KW)		
	"R" Phase	7.09		"R" Phase	8.05
	"Y" Phase	9.75		"Y" Phase	7.50



**CCS UNIVERSITY, MEERUT**  
**ENERGY AUDIT**

Rev 0

28-05-2022



Old Overhead tank			New Overhead (Rajesh Pilot)		
	"B" Phase	8.97		"B" Phase	8.27
	<b>Total</b>	<b>25.81</b>		<b>Total</b>	<b>23.82</b>
Power Drawn (KVA)				Power Drawn (KVA)	
	"R" Phase	10.58		"R" Phase	9.58
	"Y" Phase	12.66		"Y" Phase	8.24
	"B" Phase	10.81		"B" Phase	9.09
	<b>Total</b>	<b>34.05</b>		<b>Total</b>	<b>26.91</b>

Tube well Farm House			B-Tech Block C		
Voltage (Volts)				Voltage (Volts)	
	"R" Phase	241.3		"R" Phase	225.1
	"Y" Phase	241.9		"Y" Phase	226.3
	"B" Phase	234.4		"B" Phase	225.1
Current (Amps)				Current (Amps)	
	"R" Phase	36.7		"R" Phase	46
	"Y" Phase	39.7		"Y" Phase	42
	"B" Phase	38.6		"B" Phase	51
Power Factor				Power Factor	
	"R" Phase	0.81		"R" Phase	0.71
	"Y" Phase	0.86		"Y" Phase	0.67



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ENERGY AUDIT

Rev 0

28-05-2022



Tube well Farm House			B-Tech Block C		
	"B" Phase	0.86		"B" Phase	0.59
Power Drawn (KW)				Power Drawn (KW)	
	"R" Phase	7.17		"R" Phase	7.35
	"Y" Phase	8.26		"Y" Phase	6.37
	"B" Phase	7.78		"B" Phase	6.77
	<b>Total</b>	<b>23.21</b>		<b>Total</b>	<b>20.49</b>
Power Drawn (KVA)				Power Drawn (KVA)	
	"R" Phase	8.86		"R" Phase	10.36
	"Y" Phase	9.60		"Y" Phase	9.50
	"B" Phase	9.05		"B" Phase	11.48
	<b>Total</b>	<b>27.50</b>		<b>Total</b>	<b>31.34</b>

Tube well no.1, Tapovan			Tube well no.2, Tapovan		
Voltage (Volts)				Voltage (Volts)	
	"R" Phase	211.3		"R" Phase	194.5
	"Y" Phase	210.7		"Y" Phase	194.0
	"B" Phase	211.3		"B" Phase	195.1
Current (Amps)				Current (Amps)	
	"R" Phase	11		"R" Phase	17



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Tube well no.1, Tapovan			Tube well no.2, Tapovan		
	"Y" Phase	10		"Y" Phase	17
	"B" Phase	11		"B" Phase	17.5
Power Factor				Power Factor	
	"R" Phase	0.58		"R" Phase	0.83
	"Y" Phase	0.7		"Y" Phase	0.87
	"B" Phase	0.67		"B" Phase	0.81
Power Drawn (KW)				Power Drawn (KW)	
	"R" Phase	1.35		"R" Phase	2.74
	"Y" Phase	1.47		"Y" Phase	2.87
	"B" Phase	1.56		"B" Phase	2.77
	<b>Total</b>	<b>4.38</b>		<b>Total</b>	<b>8.38</b>
Power Drawn (KVA)				Power Drawn (KVA)	
	"R" Phase	2.32		"R" Phase	3.31
	"Y" Phase	2.11		"Y" Phase	3.30
	"B" Phase	2.32		"B" Phase	3.41
	<b>Total</b>	<b>6.75</b>		<b>Total</b>	<b>10.02</b>

Tube well no.3, Tapovan			Tube well no.4, Tapovan		
Voltage (Volts)				Voltage (Volts)	
	"R" Phase	204.9		"R" Phase	204.9







CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Tube well no.3, Tapovan			Tube well no.4, Tapovan		
	"Y" Phase	202.0		"Y" Phase	202.6
	"B" Phase	204.3		"B" Phase	199.7
Current (Amps)			Current (Amps)		
	"R" Phase	28.61		"R" Phase	17.81
	"Y" Phase	27.3		"Y" Phase	18.57
	"B" Phase	27.75		"B" Phase	19.1
Power Factor			Power Factor		
	"R" Phase	0.91		"R" Phase	0.88
	"Y" Phase	0.95		"Y" Phase	0.85
	"B" Phase	0.91		"B" Phase	0.91
Power Drawn (KW)			Power Drawn (KW)		
	"R" Phase	5.34		"R" Phase	3.21
	"Y" Phase	5.24		"Y" Phase	3.20
	"B" Phase	5.16		"B" Phase	3.47
	<b>Total</b>	<b>15.73</b>		<b>Total</b>	<b>9.88</b>
Power Drawn (KVA)			Power Drawn (KVA)		
	"R" Phase	5.86		"R" Phase	3.65
	"Y" Phase	5.52		"Y" Phase	3.76
	"B" Phase	5.67		"B" Phase	3.81
	<b>Total</b>	<b>17.05</b>		<b>Total</b>	<b>11.23</b>

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		28-05-2022	

**Water flow measurement:**

**Measured Parameters for Old Overhead tank:**

Sr. No.	Description	Unit	Measured
1	Input Power of Pump	KW	25.81
2	Motor Eff.	%	80
3	Shaft power	KW	20.65
4	Total Head	m	38
5	Density of Fluid	Kg/m <sup>3</sup>	1000
6	Water Flow	m <sup>3</sup> /h	98.9
7	Hydraulic Power	KW	10.24
8	<b>Pump Calculated Eff.</b>	<b>%</b>	<b>49.58</b>
9	<b>Overall Efficiency of Pump</b>	<b>%</b>	<b>39.66</b>

**Tube well Farm House**

Sr. No.	Description	Unit	Measured
1	Input Power of Pump (Motor through Analyzer)	KW	23.21
2	Motor Eff.	%	80
3	Shaft power	KW	18.57
4	Total Head	m	35
5	Density of Fluid	Kg/m <sup>3</sup>	1000



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ENERGY AUDIT

Rev 0

28-05-2022



Sr. No.	Description	Unit	Measured
6	Water Flow	m3/h	92.5
7	Hydraulic Power	KW	8.82
8	<b>Pump Calculated Eff.</b>	%	<b>47.51</b>
9	<b>Overall Efficiency of Pump</b>	%	<b>38.01</b>

**B-Tech Block C**

Sr. No.	Description	Unit	Measured
1	Input Power of Pump (Motor through Analyzer)	KW	20.49
2	Motor Eff.	%	80
3	Shaft power	KW	16.39
4	Total Head	m	35
5	Density of Fluid	Kg/m3	1000
6	Water Flow	m3/h	79.5
7	Hydraulic Power	KW	7.58
8	<b>Pump Calculated Eff.</b>	%	<b>46.26</b>
9	<b>Overall Efficiency of Pump</b>	%	<b>37.00</b>

**Tube well at Tapovan:**

			Measured Parameters			
Sr.	Description	Unit	Tube well	Tube well	Tube well	Tube well



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022





No.			No.1	No.2	No.3	No.4
1	Input Power of Pump (Motor through Analyzer)	KW	4.38	8.38	15.73	9.88
2	Motor Eff.	%	80	80	80	80
3	Shaft power	KW	3.50	6.70	12.58	7.90
4	Total Head	m	18	18	18	18
5	Density of Fluid	Kg/m3	1000	1000	1000	1000
6	Water Flow	m3/h	5.2	28.4	93.3	50.5
7	Hydraulic Power	KW	0.26	1.39	4.58	2.48
8	<b>Pump Calculated Eff.</b>	<b>%</b>	<b>7.32</b>	<b>20.81</b>	<b>36.37</b>	<b>31.35</b>
9	<b>Overall Efficiency of Pump</b>	<b>%</b>	<b>5.86</b>	<b>16.65</b>	<b>29.09</b>	<b>25.08</b>

### OBSERVATIONS

- During the study of above pumps some points were identified like submersible pumps are rewind more time due to this running current are more unbalance.
- Voltage level was found very low 335 volts. to 355 volts. This is very harmful for three phase motors.
- Power factor was also very low due to cable length and voltage drop.
- Overall efficiency of the pumps is very low due to more time rewinding of motors.

### SUGGESTIONS

- It is suggested do not use rewind motors more than 3 times.
- Increase the existing voltage level i.e., 335 volts to 415 volts.
- Install LT capacitors at motor end just after starter and improve the existing power factor to 0.90 and above.

	<p style="text-align: center;">CCS UNIVERSITY, MEERUT ENERGY AUDIT</p>	Rev 0	
		28-05-2022	

- Replace the existing old motor with new energy efficient motors with the help of govt. body EESL (Ministry of Power)

Cost for installing LT capacitors at 4 nos. Tapovan tube wells are given below.

Capacitor 5 KVAR for each tube well =Rs.1000\*5  
=Rs.5000/-

Capacitor Cost for 4 tube wells =5\*4  
= 20 KVAR  
=20\*Rs.1000  
=Rs.20000/-



### 13. STUDY OF CEILING, WALL & EXHAUST FANS:

During the study the team was collected the install capacities of ceiling fans and exhaust fans along with wattage and tabulated the same below

Sr. No	Department	FAN	Exhaust	Power Consumption for Exhaust Fans (80 W)
1	Department of Hindi	94	23	1840
2	Department of Urdu	34	9	720
3	Dara Singh Stadium	38	10	800
4	Sports	21	5	400
5	Department of Physical Education	104	26	2080
6	Department of Sociology	46	12	960
7	Department of English	26	6	480
8	Department of Seed Science	24	6	480
9	Department of Biotechnology	46	12	960
10	Department of Commerce	91	23	1840
11	Department of Home Science	20	5	400
12	M.B.A. Department	76	25	2000
13	Department of Mass Communication	77	19	1520
14	D.S.W	20	5	400
15	Pt. Deen Dayal Boys Hostel	201	50	4000
16	Dr. B.R. Ambedkar Hostel	62	15	1200
17	Answer Book Hall	111	28	2240



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	FAN	Exhaust	Power Consumption for Exhaust Fans (80 W)
18	Veer Shiromani Maharana Pratap Hostel	142	35	2800
19	Result Cell	32	8	640
20	Computer Center	46	11	880
21	Department of Political Science	59	15	1200
22	Department of Economics	70	18	1440
23	B. Tech Library	216	70	5600
24	B. Tech Hostel	150	0	0
25	B. Tech Elec. Office (Electricity Power House)	4	3	240
26	B. Tech Canteen	31	11	880
27	Administration Building (Adm. Block)	141	60	4800
28	Allahabad Bank (Indian Bank)	9	0	0
29	B. Tech Research Center	231	58	4640
30	A Block - Electronics Communication Engineering.	276	496	39680
31	B Block - Computer Science	276	496	39680
32	C Block - Agricultural Engineering.	274	493	39440
33	D Block - Mechanical Engineering /Chemical Engineering	272	492	39360
34	B. Tech Workshop	120	150	12000
35	B. Tech New Hostel	33	0	0



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	FAN	Exhaust	Power Consumption for Exhaust Fans (80 W)
36	Weather Department	3	0	0
37	B. Tech Tunkey	4	0	0
38	O. C. B	2		0
39	Sir Chotu Ram Main Gate	2		0
40	Kailash Prakash Hostel	130	12	960
41	Department of Microbiology	101	32	2560
42	R. K. Singh Hostel	116	38	3040
43	Police Chowki	4	1	80
44	Canteen	8	4	320
45	Electrical Section "B"	5	4	320
46	Engineering Section (Civil)	10	3	240
47	Department of Chemistry (New)	53	28	2240
48	Department of Chemistry (Old)	170	15	1200
49	Brahaspati Bhawan	26	6	480
50	Department of History	73	14	1120
51	Department of Law (Old)	178	39	3120
52	Department of Horticulture	48	19	1520
53	Department of Sanskrit	65	22	1760
54	Madan Mohan Vidhya Mandir School	60	5	400





Sr. No	Department	FAN	Exhaust	Power Consumption for Exhaust Fans (80 W)
55	Department of Physics Science	206	22	1760
56	Department of Geography	93	7	560
57	Hon. Kashiram Shodh Peth	282	52	4160
58	Farm House	154	63	5040
Total		5266	3081	246

**Observations:**

On behalf of above data, it is suggested replace existing ordinary ceiling fans and exhaust fans with energy efficient BLDC fans. The calculations of energy consumptions and saving are calculated below.

- Calculation of savings for 5266 number of 50-Watt Ceiling fans.**

Power consumption for 5266 nos. ceiling fans =  $5266 \times \text{nos.} \times 50 \text{ W} \times 8 \text{ hours} \times 250 \text{ days}$

= 526600 KWH/year

Energy Cost for 5266 nos. 50 W fans

=  $526600 \text{ KWH} \times \text{Rs.} 7.90/\text{KWH}$

= Rs. 4160140/-year

Power consumption for 5266 nos. BLDC ceiling fans

=  $5266 \times \text{nos.} \times 26 \text{ W} \times 8 \text{ hours} \times 250 \text{ days}$

= 273832 KWH/year

Energy Cost for 5266 nos. 26 W BLDC fans

=  $273832 \text{ KWH} \times \text{Rs.} 7.90/\text{KWH}$

= Rs. 2163270/-year

KWH saved by 26 W BLDC 5266 Nos. Fans

=  $\text{KWH } 526600 - \text{KWH } 273832$

= 252768 KWH

Energy cost saved by 5266 BLDC 26 W Ceiling Fans

=  $\text{KWH } 252768 \times \text{Rs.} 7.9/\text{KWH}$

= Rs. 1996867/-year

Cost for new 26 W BLDC 5266 nos. fans

=  $5266 \text{ nos.} \times \text{Rs.} 3000/\text{-fan}$

= Rs. 15798000/-



Cost for new fans installation and old fan removing =5266\*100  
=Rs.52660/-

Total investment for new BLDC fans =Rs.16324600/-

Simply payback in 8.5 years

- Calculation of savings for 80-watt exhaust fans (3081 Numbers)**

Power consumption for 3081 nos. Exhaust fans =3081\*nos.\*80 W \*8 hours\*250 days  
=492960 KWH/year

Energy Cost for 3081 nos. 80 W fans =492960KWH\*Rs.7.90/KWH  
=Rs.3894384/-year

Power consumption for 3081 nos. BLDC Exhaust fans =3081\*nos.\*20 W \*8 hours\*250 days  
= 123240 KWH/year

Energy Cost for 3081 nos. 20 W BLDC Exhaust fans =123240 KWH\*Rs.7.90/KWH  
=Rs.973596/-year

KWH saved by 20 W BLDC 3081 Nos. Exhaust Fans =KWH 492960 - KWH 123240  
=369720 KWH

Energy cost saved by 3081 BLDC 20 W exhaust Fans =KWH 369720\*Rs.7.9/KWH  
=Rs.2920788/-year

Cost for new 20 W BLDC 3081 nos. exhaust fans =3081 nos.\*Rs.2600/-fan  
=Rs.8010600/-

Cost for new fans installation and old fan removing =3081\*100  
=Rs.308100/-

Total investment for new BLDC Exhaust fans =Rs.8318700/-

Simply payback in approx. 3 years



## 14. STUDY OF CENTRALIZED ENERGY MONITORING SYSTEM STUDY OF ILLUMINATION

### MDI Controlling System

#### Observations & suggestions

- M.D. recoded of the plant was found running at neck-to-neck condition if problem occurs in APFC at any time; it may be cross the limit and fall in three times penalty range so a MDI controller may be required in this case.
- Centralized “**Energy Monitoring and Data Acquisition System**” for the entire plant will help to acquire the energy consumption trends and other electrical parameters data online on single point PC for the entire plant as well as for different sections of the plant.
- The system will always limit the demand within the contracted value by generating a relay output to trip any non-critical load for small duration in case the demand tends to shoot the contracted value.
- With the help of this system overall load profile can be regularly monitored and the important electrical parameters like kW load and Power Factor can be optimized.
- Benchmark can be established in terms of overall production & overall electrical power consumption. Apart from above section wise performance can also be regularly monitored in terms of efficient utilization of electrical power.
- Most importantly the above system will help to earmark the areas of the loss of electrical power in to any system deficiency. The details of the system are as follows:

#### Details of Energy Monitoring/Data Acquisition System:

##### System Overview:

- The Data Acquisition System is designed for monitoring of Power Distribution System of the complete building.
- Every area will have power analyzers in distributed area. All the parameters will be sensed by power analyzers. One analyzer will be used for every load / source location. The analyzer will have high speed communication port for communication to personal Computer software. The analyzer will have inbuilt RS485 communication port. The communication network is of 2-wire communication with multi-drop facility.
- Every area will have its own dedicated communication network via 2-core shielded cable.
- The entire communication network coming from areas will be fed to PC through protocol converters.

#### Parameters to be measured:



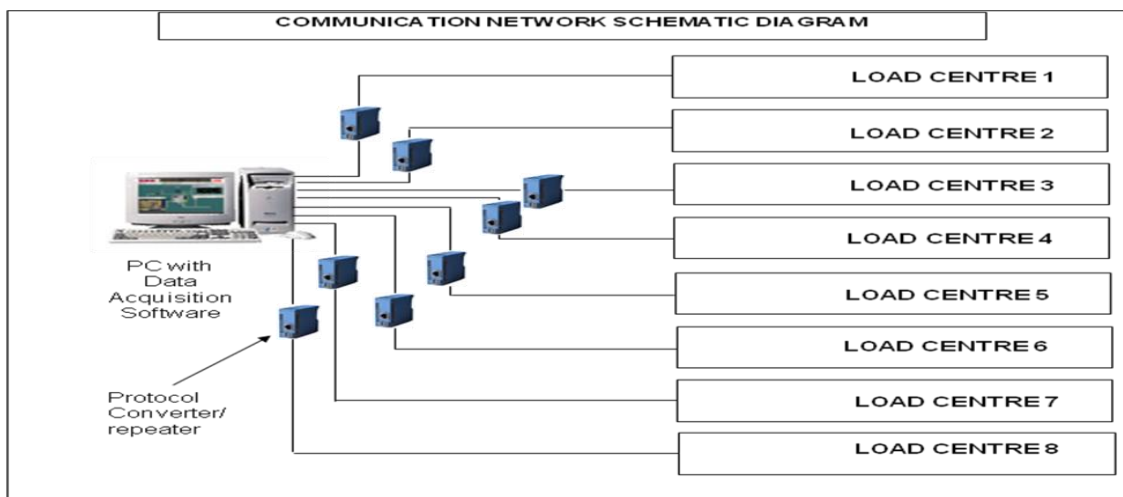
- Average Values: Amps, Volts, Frequency
- Amps & Volt Demand Parameters
- Average Power values
- Energy per Phase
- Power Demand Parameters
- Total Energy
- Min/Max Log
- Real-time Amps, Volts, Frequency
- Real-time Power Values
- Harmonic Distortion in Voltage & Current

Benefits of Energy Monitoring System:

- Regular monitoring of energy parameters
- Helpful in establishing the bench marks of performance for different utilities
- Effective tool to find out the reasons of the higher energy consumption.
- Suggest probable remedial actions.

SOFTWARE FEATURES

- The data acquisition software will collect data from all the power analyzers and will display data in following formats.



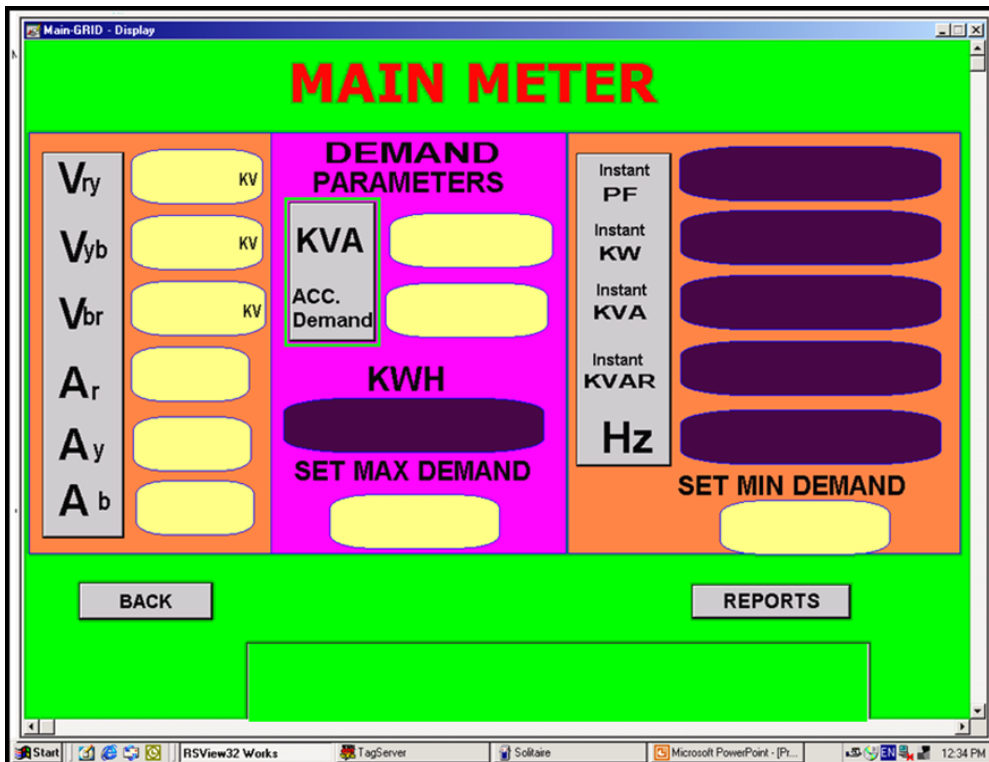


Rear View Of The Power Analyzer

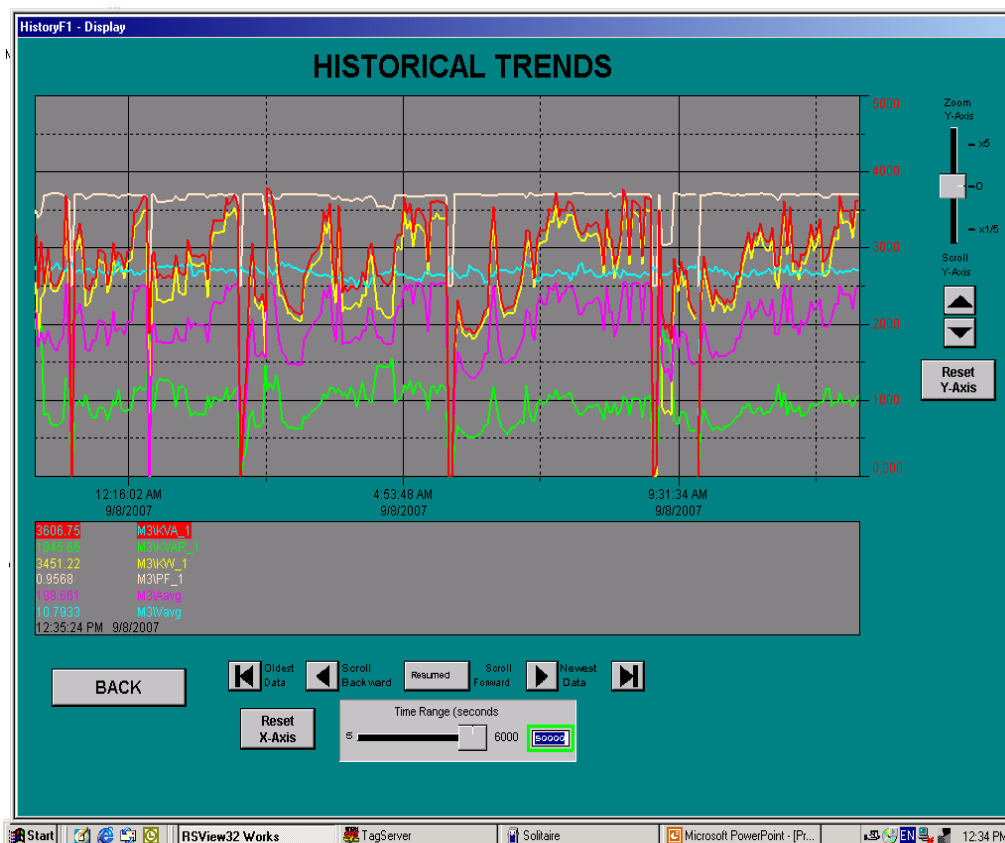


Front View Of Power Analyzer

REAL TIME VALUES OF ALL PARAMETERS



HISTORICAL DATA RECORDING AND DATA RETRIEVAL IN GRAPHICAL FORM





## 15. STUDY OF LIGHTNING AND ILLUMINATION

TL 40 W, bulb & CFL have been used at most of location in the building. However, there are also around several Conventional Tube Lights, which could be replaced by energy efficient lights. Energy Efficient Fluorescent Lamps are based on the highly sophisticated tri – phosphor fluorescent powder technology offer reduction in the power consumption besides excellent color rendering properties and high luminous efficacy.

### Lightning inventory department wise:

Sr. No	Department	Tube light	LED	TL 40W
1	Department of Hindi	129	106	5160
2	Department of Urdu	66	12	2640
3	Dara Singh Stadium	38	29	1520
4	Sports	57	5	2280
5	Department of Physical Education	152	28	6080
6	Department of Sociology	50	56	2000
7	Department of English	48	12	1920
8	Department of Seed Science	45	8	1800
9	Department of Biotechnology	44	47	1760
10	Department of Commerce	122	120	4880
11	Department of Home Science	50	10	2000
12	M.B.A. Department	164	115	6560
13	Department of Mass Communication	124	47	4960
14	D. S. W	12	26	480
15	Pt. Deen Dayal Boys Hostel	392	20	15680



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	Tube light	LED	TL 40W
16	Dr. B.R. Ambedkar Hostel	190	45	7600
17	Answer Book Hall	224	17	8960
18	Veer Shiromani Maharana Pratap Hostel	351	56	14040
19	Result Cell	82	0	3280
20	Computer Center	142	10	5680
21	Department of Political Science	98	36	3920
22	Department of Economics	69	146	2760
23	B. Tech Library	490	0	19600
24	B. Tech Hostel	374	0	14960
25	B. Tech Elec. Office (Electricity Power House)	12	0	480
26	B. Tech Canteen	77	0	3080
27	Administration Building (Adm. Block)	230	59	9200
28	Allahabad Bank (Indian Bank)	10	0	400
29	B. Tech Research Center	475	50	19000
30	A Block - Electronics' Communication Engineering	20	0	800
31	B Block - Computer Science	25	0 0	1000
32	C Block - Agricultural Engineering	10	0	400
33	D Block - Mechanical Engineering /Chemical Engineering	10	0	400





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	Tube light	LED	TL 40W
34	B. Tech Workshop	20	0	800
35	B. Tech New Hostel	0	56	0
36	Weather Department	8	0	320
37	B. Tech Tunkey	0	7	0
38	O. C. B		4	0
39	Sir Chotu Ram Main Gate	2		80
40	Kailash Prakash Hostel	302	20	12080
41	Department of Microbiology	161	81	6440
42	R. K. Singh Hostel	306	6	12240
43	Police Chowki	8	0	320
44	Canteen	12	0	480
45	Electrical Section "B"	13	0	520
46	Engineering Section (Civil)	24	2	960
47	Department of Chemistry (New)	176	98	7040
48	Department of Chemistry (Old)	296	56	11840
49	Brahaspati Bhawan	150	14	6000
50	Department of History	212	24	8480
51	Department of Law (Old)	240	26	9600
52	Department of Horticulture	89	16	3560
53	Department of Sanskrit	93	17	3720



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	Tube light	LED	TL 40W
54	Madan Mohan Vidhya Mandir School	72	8	2880
55	Department of Physics Science	287	178	11480
56	Department of Geography	135	2	5400
57	Hon. Kashiram Shodh Peth	463	65	18520
58	Farm House	108	98	4320
<b>Total</b>		<b>7559</b>	<b>1838</b>	<b>302</b>

**Lighting Inventory Residence wise:**

Sr. No	Residence	Tube light	LED	TL 40W
1	AB-1 Campus	11	7	440
2	AB-2	3	10	120
3	AB-3	7	8	280
4	AB-4	14	6	560
5	AB-5	10	15	400
6	A-1 Campus	12	10	480
7	A-2	13	5	520
8	A-3	12	7	480
9	A-4	4	10	160
10	A-5	6	4	240
11	A-6	4	8	160
12	B-1 Campus	7	7	280



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Residence	Tube light	LED	TL 40W
13	B-2	7	3	280
14	B-3	6	4	240
15	B-4	4	7	160
16	B-5	4	6	160
17	B-6	5	5	200
18	B-7	5	4	200
19	B-8	3	7	120
20	B-9	3	10	120
21	B-10	2	9	80
22	B-11	0	8	0
23	C-1 Campus	3	7	120
24	C-2	3	5	120
25	C-3	3	6	120
26	C-4	2	5	80
27	C-5	2	7	80
28	C-6	5	4	200
29	C-7	0	10	0
30	C-8	4	4	160
31	C-9	7	3	280
32	C-10	2	7	80



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Residence	Tube light	LED	TL 40W
33	C-11	2	6	80
34	C-12	4	5	160
35	C-13	1	4	40
36	C-14	2	6	80
37	C-15	2	10	80
38	C-16	8		320
39	C-17	6		240
40	C-18	3	3	120
41	C-19	3	6	120
42	C-20	6	3	240
43	C-21	2	10	80
44	C-22	0	8	0
45	C-23	6	5	240
46	C-24	3	5	120
47	D-1 Campus	1	8	40
48	D-2	1	5	40
49	D-3	1	5	40
50	D-4	2	4	80
51	D-5	1	6	40
52	D-6	3	3	120



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Residence	Tube light	LED	TL 40W
53	D-7	1	6	40
54	D-8	3	4	120
55	D-9	4	5	160
56	D-10	3	3	120
57	D-11	1	6	40
58	D-12	3	2	120
59	D-13	0	6	0
60	D-14	2	3	80
61	D-15	2	5	80
62	D-16	1	2	40
63	D-17	0	3	0
64	D-18	1	3	40
65	D-19	0	4	0
66	D-20	2	2	80
67	D-21	1	4	40
68	D-22	2	2	80
69	D-23	2	2	80
70	D-24	2	2	80
71	D-25	2	3	80
72	D-26	3	4	120



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Residence	Tube light	LED	TL 40W
73	D-27	2	5	80
74	D-28	3	3	120
75	H-1 Campus	6	3	240
76	H-2	5	2	200
77	H-3	3	2	120
78	H-4	4	3	160
79	H-5	5	2	200
80	H-6	2	2	80
81	H-7	4	6	160
82	H-8	5	3	200
83	H-9	2	2	80
84	H-10	3	5	120
85	H-11	3	7	120
86	H-12	3	3	120
87	H-13	3	5	120
88	H-14	4	4	160
89	H-15	2	3	80
90	H-16	4	3	160
91	S-1 Campus	8	3	320
92	S-2	6	2	240



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Residence	Tube light	LED	TL 40W
93	S-3	4	5	160
94	S-4	8	3	320
95	S-5	12	2	480
96	S-6	7	6	280
97	S-7	5	2	200
98	S-8	6	3	240
99	S-9	5	0	200
100	S-10	2	0	80
101	S-11	3	0	120
102	S-12	4	0	160
103	S-13	6	0	240
104	S-14	3	0	120
105	S-15	4	0	160
106	S-16	9	0	360
107	S-17	5	0	200
108	S-18	6	0	240
109	S-19	7	0	280
110	S-20		7	0
111	S-21	5	0	200
112	S-22	6	0	240



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Residence	Tube light	LED	TL 40W
113	S-23	4	0	160
114	S-24	4	3	160
115	S-25	3	0	120
116	S-26	6	2	240
117	S-27	4	0	160
118	S-28	5	2	200
119	S-29	4	2	160
120	S-30	4	0	160
121	S-31	2	0	80
122	S-32	4	0	160
123	S-33	5	3	200
124	S-34	4	2	160
125	S-35	4	3	160
126	S-36	4	0	160
127	S-37	4	4	160
128	S-38	0	3	0
129	S-39	6	5	240
130	S-40	5	3	200
131	S-41	0	3	0
132	S-42	5	3	200





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Residence	Tube light	LED	TL 40W
133	S-43	6	2	240
134	S-44	6	3	240
135	S-45	6	4	240
136	S-46	4	3	160
137	S-47	6	3	240
138	S-48	8	3	320
139	S-49	8	3	320
140	S-50	7	2	280
141	S-51	2	11	80
142	S-52	8	3	320
143	S-53	3	0	120
144	S-54	4	0	160
145	S-55	3	0	120
146	S-56	4	0	160
				0
<b>Total</b>		<b>601</b>	<b>562</b>	24.04

**Lighting inventory residence teen shade wise:**

Sr. No	Residence (Teen Shade)	Tube light	LED	TL 40 W
1	Bindra Prasad	8	8	320
2	Swami Charan	5	3	200



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Residence (Teen Shade)	Tube light	LED	TL 40 W
3	Pappu Chaudhary	3	2	120
4	Sanjeev Kumar	9	0	360
5	Ranglal	2	0	80
6	Rinku Chaudhary	3	2	120
7	Ganga Ram	1	1	40
8	Anil Shukla	6	2	240
9	Mahadev	3	2	120
10	Satish Chaudhary	4	2	160
11	Arun Panday	5	4	200
12	Vidhya Dhar Dubey	4	3	160
13	Ravindra Panday	7	7	280
14	Dabal Singh	3	2	120
15	Anjani Panday	6	5	240
<b>Total</b>		<b>69</b>	<b>43</b>	<b>2.76</b>



**Lighting inventory girls Hostel wise**

Sr. No	Hostel (Durga Bhabhi Girls Hostel)		Tube light	LED	TL 40 W
	Block	Rooms			
1	A - Block	30	67	10	2680
2	B - Block	24	44	15	1760
3	C - Block	30	66	12	2640
4	D - Block	36	70	20	2800
5	E - Block	24	48	8	1920
6	F - Block	30	52	7	2080
7	G - Block	06	17	0	680
8	H- Block	06	18	0	720
9	Study Room		0	16	0
10	T.V Room		6	0	240
11	Bathroom Near T.V Room		6	0	240
12	Hostel Gallary		10	5	400
13	Maton office + Warden Residence		8	3	320
14	Clerk Office		4	0	160
15	Pol Life		11	0	440
16	1st Guard Room		6	0	240
17	2nd Guard Room		3	0	120
18	Mess		23	10	920



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Hostel (Durga Bhabhi Girls Hostel)		Tube light	LED	TL 40 W
	Block	Rooms			
19	Visitor Lobby		5	0	200
					0
Total			464	106	18.56

LIGHTING INVENTERY Boys Hostel wise

Sr. No	Hostel (Rani Laxmi Boys Hostel)		Tube light	LED	TL 40 W
	Block	Rooms			
1	A - Block	33	66	0	2640
2	B - Block	39	78	0	3120
3	C - Block	39	78	0	3120
4	Healt Club		0	30	0
5	Mess		26	0	1040
6	Clerk Office		5	10	200
7	A - Block Gallary		14	20	560
8	B - Block Gallary		28	10	1120
9	C - Block Gallary		24	14	960
10	A - Block Bathroom		11	15	440
11	B - Block Bathroom		6	10	240
12	C - Block Bathroom		23	6	920
13	Study Room		0	20	0



Sr. No	Hostel (Rani Laxmi Boys Hostel)		Tube light	LED	TL 40 W
	Block	Rooms			
14	A - Block Porch		0	0	0
15	B - Block Porch		0	0	0
16	C - Block Porch		0	0	0
Total			359	135	14.36

### Lighting Inventory - street lights

S. No	Department/Place	Street Light		Sodium Light 125 W+ Choke
		Sodium	LED	
1	Department of Microbiology - Chemistry	11	4	1650
2	Canteen - Guard Room	10	17	1500
3	Department of Microbiology - Peer Baba	29	36	4350
4	Auditorium - Peer Baba	16	84	2400
5	O.B.C		2	0
6	Sir Chotu Ram Main Gate	4	1	600
Total		70	144	10.5



**Total number of lights replace with energy efficient LED lights**

Sr. No	Department	light 125 W+ Choke	Total nos. of 40 W TL	Total load in KW	125 W light load in KW
1	Department wise		7559	302.36	
2	Residence wise		601	24.04	
3	Residence teen shade wise		69	2.76	
4	Girls Hostel wise		464	18.56	
5	Street lights	70			10.5
6	Total	70	8693	347.72	10.5

**Installation of Energy Efficient LED Lights**

CCS university management were very aware about energy conservation and they have already replaced most of the conventional with energy efficient LED light. However, there are also around 8693 No's STL lights of 40 W with and around 70 nos. of 125 W with Choke conventional sodium lights are installed in the building, which could be replaced by energy efficient Fluorescent lights.

Energy Efficient LED offer reduction in the power consumption besides excellent color rendering properties and high luminous efficacy.

The resultant benefit in terms of Energy Savings has been worked out as follows:

A. Replacement of conventional 40 W STL lights

• Power drawn by conventional 40 W	= 40W
• Power Drawn by one LED Light (20 Watts)	= 20 W
• No of Lights to be replaced	= 8693 nos.
• Power drawn by 8693 nos. 40 W lights	= 347.72 KW



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



• Power drawn by 8693 nos.20W, LED	= 173.86 KW
• Energy saved by Using 20 W LED 8693 nos.	= 173.86 KW
• KWH saved by using LED light of 8693 nos.(173.86 KW*12hours*300 Days)	= 625896 KWH/year
• Annual Saving in Rs.7.9 KWH	= Rs.4944578/-year
• Investments for 8693 nos. LED lights @Rs.200/LED	= Rs.1738600/-
• Payback	= Within 3 Months

B. Replacement of conventional Sodium (125Watts Light +Choke) lights

• Power drawn by conventional Sodium (125Watts Light+ 25 W Chock)	= 150 W
• Power Drawn by one Led Light (70 Watts)	= 70 W
• No of Lights to be replaced	= 70 nos.
• Power drawn by 70 nos. 125 W Sodium lights	10.5 KW
• Power drawn by 70 nos.70 W, LED	= 4.9 KW
• Energy saved by Using 70 w LED 70 nos.	= 5.6 KW
• KWH saved by using LED light of 70 nos.(5.6KW*12 hours*365 Days)	= 24528 KWH/year
• Annual Saving in Rs.7.9/KWH/year	= Rs.193770/-year
• Investments for 70 nos. LED lights @Rs.2500/LED	= Rs.175000/-
• Payback	= Within 2 Months

Lighting Control



Although there is no simpler way to reduce the amount of energy consumed by lighting system than to manually turn OFF whenever not needed, this is not done as often as it could be. In response, automatic lighting control strategies can be adopted:

- Scheduling Control: Use a time scheduling device to control lighting systems according to predetermined schedules

A central processor with relays is usually capable of controlling several output channels, each of which may be assigned to one or more lighting circuits. Overrides can be provided to accommodate individuals who use the space during scheduled off hours.

- Day lighting: Control lights in response to the presence of daylight illumination in the space
- Lumen Maintenance: gradually adjust the electric light levels over time to correspond with the depreciation of light output from ageing lamps.
- Occupancy Sensing: Control light in response to the presence or absence of people in the space

These are automatic scheduling devices that detect motion and turn ON / OFF the lights accordingly. Most of these devices can be calibrated for sensitivity and for the length of time delay between the last detected occupancy and extinguishing of light. Occupancy sensors typically consist of a motion detector, a control unit and a relay. Quantification of energy savings on this account is not possible.

#### Illumination Level (Lux level)

Location		Sample-1	Sample-2	Sample-3	Sample-4	Average
M- Phil Building-1st Floor	Lobby	47	47	34	37	41.25
	Main Office	61	30	45	47	45.75
	Classroom	89	75	96	110	92.5
	BIF Lab	59	64	34	69	56.5
	Dean Office	204	240	170	247	215.25





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Location		Sample-1	Sample-2	Sample-3	Sample-4	Average
	Nano Science Lab	115	120	150	125	127.5
	Agrigenom e Lab	248	249	215	270	245.5
	Gallery	69	70	70	65	68.5
M- Phil Building-2nd Floor	Classroom Mathematics	65	40	39	42	46.5
	Main Office	70	40	55	45	52.5
	Lobby	38	40	35	39	38
	Prof. Gupta Office	100	109	100	105	103.5
	M.K. Gupta office	170	169	165	160	166
	Shivraj Singh Office	228	324	229	247	257
	Computer Lab	77	104	80	96	89.25
	Shivraj Singh Office-2	403	412	399	405	404.75
	Saru Kumari	143	140	130	139	138



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Location		Sample-1	Sample-2	Sample-3	Sample-4	Average
	office					
	Sandip Kumar office	161	164	162	159	161.5
M-Phil Building- 3rd floor	Seminar Hall	60	64	62	58	61
	Mr.Pratap office	140	149	147	143	144.75
	Prof. And Head Office	103	104	101	100	102
	Dark Room	197	200	195	198	197.5
	H.S. Baloyan office	204	230	211	221	216.5
Admin Building Main	Lobby	182	189	185	181	184.25
	Richa Bhatt Office	231	230	225	227	228.25
	Lekha Vibhag	170	126	139	145	145
	Account Section Office	128	130	125	127	127.5
	Check Righter	235	239	231	237	235.5



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Location		Sample-1	Sample-2	Sample-3	Sample-4	Average
	office					
	Office-1	139	142	137	140	139.5
	Office-2	148	188	170	169	168.75
	Office-3	162	161	159	158	160
	Office-4	229	220	205	225	219.75
	Pariksha Nyantran vibhag	75	103	99	101	94.5
	Exam Section	97	99	95	93	96
	Exam Section office	146	145	132	139	140.5
	Affiliation Office-1	145	146	142	147	145
	Affiliation Office-2	87	89	85	90	87.75
	Affiliation Office-3	96	98	95	93	95.5
	Affiliation Office-4	67	64	63	66	65
	Affiliation Office-5	72	73	71	74	72.5



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Location		Sample-1	Sample-2	Sample-3	Sample-4	Average
	B.ed Departmen t	147	149	146	148	147. 5
	Committee Cell Office	95	97	98	92	95.5
VC Office	Lobby	376	379	348	355	364. 5
	Office-1	377	247	249	265	284. 5
	Office-2	349	384	376	380	372. 25
	Kulpati Office	135	139	134	132	135
	Prati Kulpati Office	413	433	425	420	422. 75
	Committee Meeting Cell	403	401	413	402	404. 75
	Resistar Office	107	109	111	108	108. 75
	Dc Office	229	229	224	226	227
Auditorium-1	At Right Side Row	247	240	239	232	239. 5
	At Left Side Row	261	234	234	239	242
	Middle	39	27	28	27	30.2



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Location		Sample-1	Sample-2	Sample-3	Sample-4	Average
	Row					5
	At Stage	249	311	208	207	243.75
Engineering Department	Manish Mishra Office (Electrical)	180	182	184	183	182.25
	Manoj Kumar(Civil Engineer)	103	104	101	102	102.5
	Main Office	72	73	64	69	69.5
Admin Building -2 Near Substaion C-2nd floor	Office	273	170	169	204	204
	Lobby	103	168	159	134	141
	Ved Vyas Office	117	119	123	164	130.75
	Committee Room	250	253	289	284	269
	Account Section	139	135	142	140	139
	Account Office	103	104	118	99	106
	Admin Office	150	153	145	147	148.75
Admin Building -2 Near	Exam Cell	134	150	139	138	140.25



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Location		Sample-1	Sample-2	Sample-3	Sample-4	Average
Substaion C- 3rd floor	CCTV Camera Room	210	150	160	175	173. 75
	Class Room	40	45	49	47	45.2 5
	1st Room	104	120	133	125	120. 5
	Placement Cell	93	69	63	74	74.7 5
Auditorium New	At stage	333	340	337	345	338. 75
	At Left Side Row	100	80	99	95	93.5
	Middle	168	160	129	145	150. 5
	At Right Side Row	90	98	95	93	94



## 16. OTHER CONNECTED LOAD

Sr. No	Department	No. of Computers	Load in W
1	Russian Department	12	840
2	Proctor office	2	140
3	Computer Centre Department	25	1750
4	Chemistry Department	49	3430
5	Horticulture Department	2	140
6	Brahaspati Bhawan		0
7	Microbiology Department	60	4200
8	Geography Department	4	280
9	Physics Department	21	1470
10	History Department	8	560
11	Legal Studies Department	11	770
12	Political Science Department	15	1050
13	Hon. Kanshiram Shodh Peeth Sansthan	3	210
14	Applied Science Department	5	350
15	B.tech ADM Block	373	26110
16	B.tech A-Block		0
17	B.tech C-Block		0
18	B.tech B-Block		0
19	B.tech D-Block		0



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. of Computers	Load in W
20	B.tach Library		0
21	V.C Lodge	1	70
22	V.C Office	4	280
23	Committee Hall		0
24	Committee Cell	2	140
25	Account Section	24	1680
26	Exam Section	4	280
27	Registrar Office	4	280
28	F.C Office	4	280
29	Affiliation	6	420
30	IQAC6	6	420
31	Secrecy	4	280
32	Auditorium		0
33	First Appeal Officer	1	70
34	R.T.I Department		0
35	AG botany	31	2170
36	Botany Department	40	2800
37	Zoology Department	33	2310
38	Hindi Department	15	1050





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. of Computers	Load in W
39	Urdu Department	15	1050
40	Mathematics Department	35	2450
41	Computer center new bill		0
42	M B A	27	1890
43	Mass Communication	39	2730
44	Answer book	2	140
45	Dispensary	2	140
46	Guest House	1	70
47	Community Centre	3	210
48	Sports	3	210
49	Sociology	16	1120
50	Centre of Excellence	0	0
51	Physical Education	10	700
52	Library	76	5320
53	Electrical Section	3	210
54	Economics Department	36	2520
55	Education Department	26	1820
56	Psychology Department	8	560
57	Statistics Department	22	1540



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. of Computers	Load in W
58	Biotechnology Department	13	910
59	English Department	26	1820
60	Seed Science Department	8	560
61	General Section	1	70
62	B.ed Cell	2	140
63	Exam Controller Office	4	280
64	Pro V.C Office	2	140
65	Fine Art Department	1	70
66	Toxicology Department	3	210
67	M.C.A. Department	34	2380
68	Rajesh Pilot Hostel	0	0
69	Adm. Block (308)	1	70
70	Confidential Section	6	420
71	Yoga	0	0
72	Sanskrit Department	3	210
73	Engineering Section (Civil)	2	140
74	Library Science		0
75	Plant Protection	3	210
76	Food science	3	210



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. of Computers	Load in W
77	Result Cell	1	70
78	D.S.W	2	140
79	Chief Warden Office	2	140
80	B.com	34	2380
81	Home Science	8	560
82	Dara Singh Khusti Stadium	1	70
83	MBHA	7	490
84	Madan Mohan School	7	490
85	309	2	140
86	301	1	70
87	NSS	1	70
88	Development Cell	1	70
89	Campus Cell	1	70
90	Vigilance Office	1	70
91	Legal Cell	2	140
92	Pro Registrar	2	140
93	Shodh Mulyankan	1	70
94	Puchatch Kendra	6	420
95	Shodh Panjiyan	2	140



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. of Computers	Load in W
96	Chatra Sahayta Kendra	4	280
97	Central Evaluation Centre	10	700
<b>Total</b>		1301	91.07

**Inventory of air conditioner**

Sr. No	Department	No. Of Air Conditioner
1	V.C. Office	9
2	Comity Cell Department	3
3	P.V.C. Office	2
4	Registrar Office	5
5	F.O. Office	3
6	R.T.I. Cell	2
7	General Section	2
8	First Appellate Officer	2
9	Affiliation	1
10	Account Section	12
11	Exam Controller Office	2
12	Comity Cell Department)	3
13	Room No. 210	1
14	Room No. 308	1



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. Of Air Conditioner
15	Exam Department	2
16	Confidential Department	3
17	Community Center	6
18	Auditorium	1
19	Late Rajesh Pilot Hostel	4
20	Sports	2
21	Department of Physical Education	3
22	Department of English	6
23	Department of Seed Science	2
24	Department of Yoga	1
25	Department of Sociology	7
26	Department of Biotechnology	6
27	S.B.S	6
28	Department of Mass Communication	5
29	Center of Excellence	2
30	Department of Statistics	10
31	Department of Psychology	7
32	Department of Fine Art	1
33	New Computer Center Building	1
34	Department of Russian Language	6



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. Of Air Conditioner
35	D.S.W	2
36	Department of Horticulture	3
37	Department of Sanskrit	2
38	Brhaspati Bhawan	12
39	Department of Microbiology	14
40	Student Help Center	2
41	Department of Zoology	39
42	Animal House	14
43	Plant Protection	7
44	AG Botany	38
45	Hon. Kashi Ram Sodeh Peeth Sasthan	12
46	Department of History	8
47	Department of Law	1
48	New Mass Communication	2
49	B.tech ADM Block	21
50	B.tech A - Block	5
51	B.tech B -Block	14
52	B.tech C -Block	1
53	B.Tech D - Block	6
54	B.tech Library	4



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. Of Air Conditioner
55	Dispensary	2
56	Department of Hindi	9
57	Department of Urdu	3
58	Department of Physics	31
59	Exam Section	5
60	Department of Economics	17
61	Department of Political Science	18
62	Answer Book Hall	2
63	Library	9
64	Civil Section	3
65	Electrical Section	3
66	Department of Mathematics	17
67	Guest House	22
68	Computer Center	16
69	V.C Lodge	12
70	IQAC	6
71	M.C.A Hall	4
72	Secrecy	3
73	Library Science	6
<b>Total</b>		<b>524</b>



**Inventory of water coolers:**

Sr. No	Department	No. of Cooler
1	Confidential	1
2	Confidential Out Side	1
3	Exam Section	2
4	Adam Block	6
5	Library	5
6	Auditorium	1
7	Guest House	1
8	D.B.G Hostel	7
9	Rani Laxmi Bai New Girls Hostel	6
10	Department of Urdu	1
11	Department of Hindi	1
12	Department of Zoology	2
13	Department of AG Botany	3
14	Department of Botany	2
15	K.P Hostel	5
16	R.K Hostel	7
17	Department of Geography	1
18	Department of Physics	2
19	Department of History	2





CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. of Cooler
20	Department of Legal Studies	1
21	Madan Mohan Vidya Mandir	1
22	Engineering Section (Civil)	1
23	Department of Microbiology	1
24	Department of Chemistry	2
25	New Building Chemistry	2
26	Department of Russian Language	1
27	D.S.W	1
28	Department of Sanskrit	1
29	Department of Physiology	1
30	Department of Fine Art	1
31	Department of Statics	1
32	S.B.S	2
33	Department of English	1
34	Department of Sociology	2
35	Department of Seed Science	1
36	Department of Biotechnology	1
37	Sports	1
38	Department of Political Science	2
39	Department of Economics	1



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. of Cooler
40	Department of Education	0
41	Computer Center	1
42	Canteen	1
43	Engineering Section (Electrical)	0
44	Hon. Kashi Ram Sodeh Peeth Sasthan	3
45	Department Of Applied Science	6
46	Reading Room	1
47	Late.Rajesh Pilot Hostel	2
48	Veer Siromani Mahrana Pratap Hostel	3
49	Dr. Ambedkar Hostel	2
50	B.tech Hostel	4
51	B.tech ADM Block	3
52	B.Tech A - Block	3
53	B.Tech. B. Rlock	3
54	B.Tech. C. Block	2
55	B.Tech D - Block	2
56	R.Tech. Library	3
57	B.Tech. Work Shop	1
58	B.Tech. Canteen	1
59	V.C.Lodge	1



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Sr. No	Department	No. of Cooler
60	Community Centre	1
61	Answer Book Hall	1
62	Department of Physical Education	2
63	Department of Yoga	1
64	Department of Environment	2
65	Dara Singh Stadium	1
66	Pt. Deen Dayal Boys Hostel	5
67	Main Gate C.C.S.U	1
68	Department of M.C.A	1
69	Main Gate B-Tech	1
70	IQAC	1
71	V.C. Office	1
72	Centre of Excellence	1
73	Department of Library Science	1
74	Department of Horticulture	1
<b>Total</b>		<b>144</b>



## 17. ANNEXURE 1 RECOMMENDED LUX LEVELS

### Recommended Lux Levels for different locations

<b>Entrance</b>	
Entrance halls, lobbies, waiting rooms	200
Enquiry Desks	500
Gate Houses	200
<b>Circulation Areas</b>	
Lifts	100
Corridors, passageways, stairs	100
Escalators, revelators	150
<b>Medicine &amp; First Aid Centers</b>	
Consulting Rooms, Treatment Rooms	500
Rest Rooms	150
Medical Stores	150
<b>Staff Rooms</b>	
Offices	300
Changing, locker and cleaners room, Cloak rooms, lavatories	100
Rest Rooms	150
<b>Staff Restaurants</b>	
Canteens, Cafeterias, dining rooms, mess rooms	200
Survey, vegetable preparation, washing up area	300



CCS UNIVERSITY, MEERUT  
ENERGY AUDIT

Rev 0

28-05-2022



Food preparation & cooking	500
Food stores, cellars	150
<b>Communication</b>	
Switch board rooms	300
Telephone, apparatus rooms	150
Telex room, post rooms	500
Reprographic room	300



### 18. ANNEXURE 2 KVAR SELECTION CHART

Original Power Factor	Desired Power Factor																				
	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.9	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
	KVAR Required per KW of Load																				
0.50	0.982	1.008	1.034	1.060	1.086	1.112	1.139	1.165	1.192	1.220	1.248	1.276	1.306	1.337	1.369	1.403	1.440	1.481	1.529	1.590	1.732
0.51	0.937	0.963	0.989	1.015	1.041	1.067	1.093	1.120	1.147	1.174	1.202	1.231	1.261	1.291	1.324	1.358	1.395	1.436	1.484	1.544	1.687
0.52	0.893	0.919	0.945	0.971	0.997	1.023	1.049	1.076	1.103	1.130	1.158	1.187	1.217	1.247	1.280	1.314	1.351	1.392	1.440	1.500	1.643
0.53	0.850	0.876	0.902	0.928	0.954	0.980	1.007	1.033	1.060	1.088	1.116	1.144	1.174	1.205	1.237	1.271	1.308	1.349	1.397	1.458	1.600
0.54	0.809	0.835	0.861	0.887	0.913	0.939	0.965	0.992	1.019	1.046	1.074	1.103	1.133	1.163	1.196	1.230	1.267	1.308	1.356	1.416	1.559
0.55	0.768	0.794	0.820	0.846	0.873	0.899	0.925	0.952	0.979	1.006	1.034	1.063	1.092	1.123	1.156	1.190	1.227	1.268	1.315	1.376	1.518
0.56	0.729	0.755	0.781	0.807	0.834	0.860	0.886	0.913	0.940	0.967	0.995	1.024	1.053	1.084	1.116	1.151	1.188	1.229	1.276	1.337	1.479
0.57	0.691	0.717	0.743	0.769	0.796	0.822	0.848	0.875	0.902	0.929	0.957	0.986	1.015	1.046	1.079	1.113	1.150	1.191	1.238	1.299	1.441
0.58	0.655	0.681	0.707	0.733	0.759	0.785	0.811	0.838	0.865	0.892	0.920	0.949	0.979	1.009	1.042	1.076	1.113	1.154	1.201	1.262	1.405
0.59	0.618	0.644	0.670	0.696	0.723	0.749	0.775	0.802	0.829	0.856	0.884	0.913	0.942	0.973	1.006	1.040	1.077	1.118	1.165	1.226	1.368
0.60	0.583	0.609	0.635	0.661	0.687	0.714	0.740	0.767	0.794	0.821	0.849	0.878	0.907	0.938	0.970	1.005	1.042	1.083	1.130	1.191	1.333
0.61	0.549	0.575	0.601	0.627	0.653	0.679	0.706	0.732	0.759	0.787	0.815	0.843	0.873	0.904	0.936	0.970	1.007	1.048	1.096	1.157	1.299
0.62	0.515	0.541	0.567	0.593	0.620	0.646	0.672	0.699	0.726	0.753	0.781	0.810	0.839	0.870	0.903	0.937	0.974	1.015	1.062	1.123	1.265
0.63	0.483	0.509	0.535	0.561	0.587	0.613	0.639	0.666	0.693	0.720	0.748	0.777	0.807	0.837	0.870	0.904	0.941	0.982	1.030	1.090	1.233
0.64	0.451	0.477	0.503	0.529	0.555	0.581	0.607	0.634	0.661	0.688	0.716	0.745	0.775	0.805	0.838	0.872	0.909	0.950	0.998	1.058	1.201
0.65	0.419	0.445	0.471	0.497	0.523	0.549	0.576	0.602	0.629	0.657	0.685	0.714	0.743	0.774	0.806	0.840	0.877	0.919	0.966	1.027	1.169
0.66	0.388	0.414	0.440	0.466	0.492	0.519	0.545	0.572	0.599	0.626	0.654	0.683	0.712	0.743	0.775	0.810	0.847	0.888	0.935	0.996	1.138



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**\*\*\*END OF THIS REPORT\*\*\***