ENERGY AUDIT REPORT

January 2020

For

FATIMA COLLEGE
Mary Land
Madurai-625018.

Audited by

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ACKNOWLEDGEMENT

TJ Solutions, Madurai are thankful to Principal for giving us the opportunity to carry out Energy audit of M/s FATIMA COLLEGE, Mary Land, Madurai, Tamil Nadu 625018. Without whose keen interest, this audit would not have been possible.

TJ Solutions team are also thankful to all other supporting Officers / Staffs of above unit for their wholehearted support, hospitality and the courtesy extended to the Audit team during the course of the study.

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TJ Solutions
29/01/2020
Madurai-10

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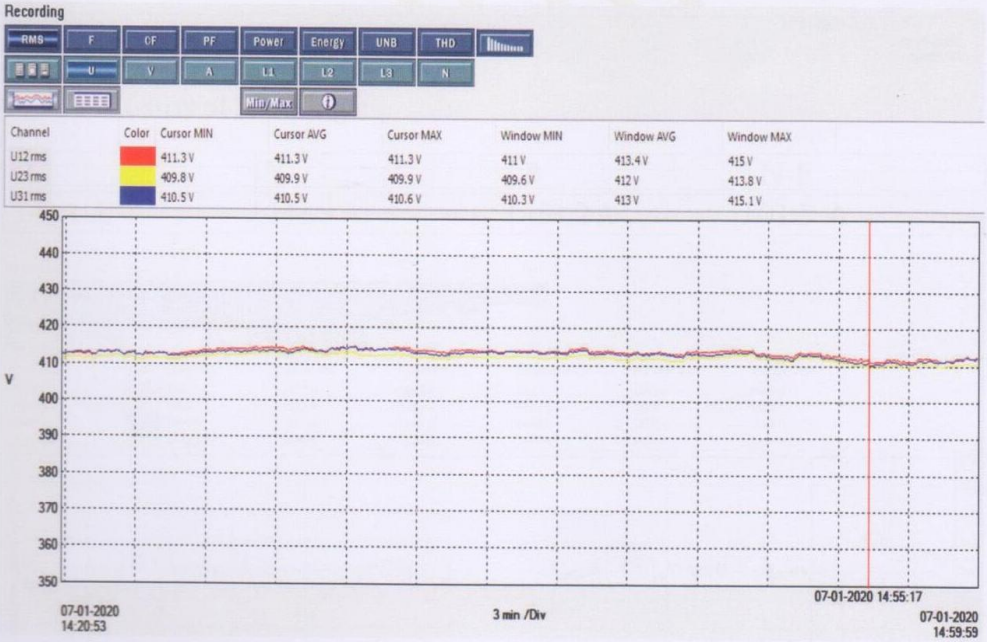
I. MAIN PANEL (HT):

Date of Audit	07-01-2020	
TANGEDCO Service. NO	05-9094630106	
	Tariff	Permitted MD
	HT	300 KVA

1.1. Phase to Phase Voltage Readings:

RY	YB	BR
411.3 V	409.8 V	410.5 V



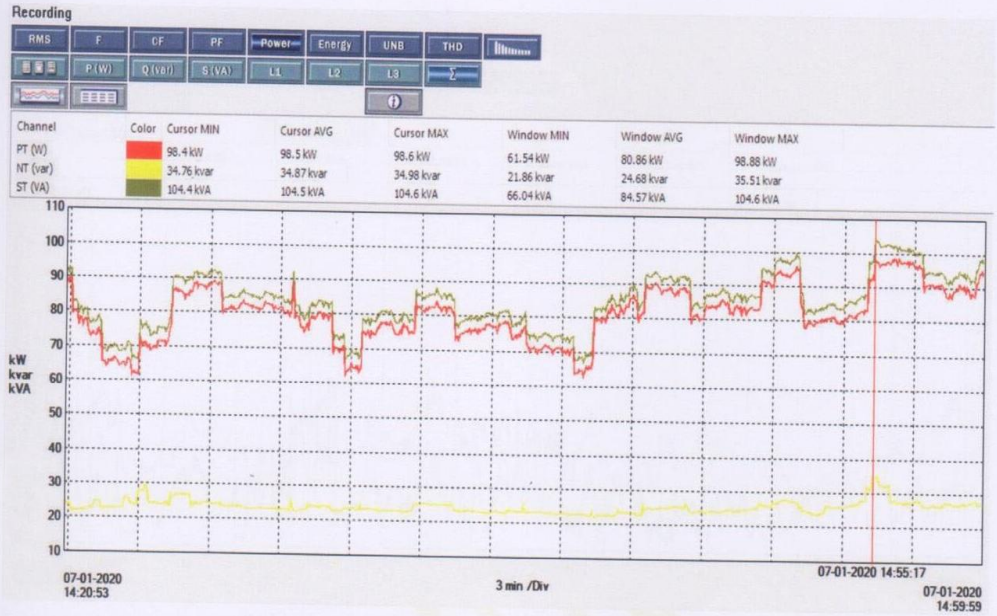
1.2. Phase to Neutral Voltage Readings:

R-N	Y-N	B-N
237.7 V	237 V	236.4

1.3. Current Readings:

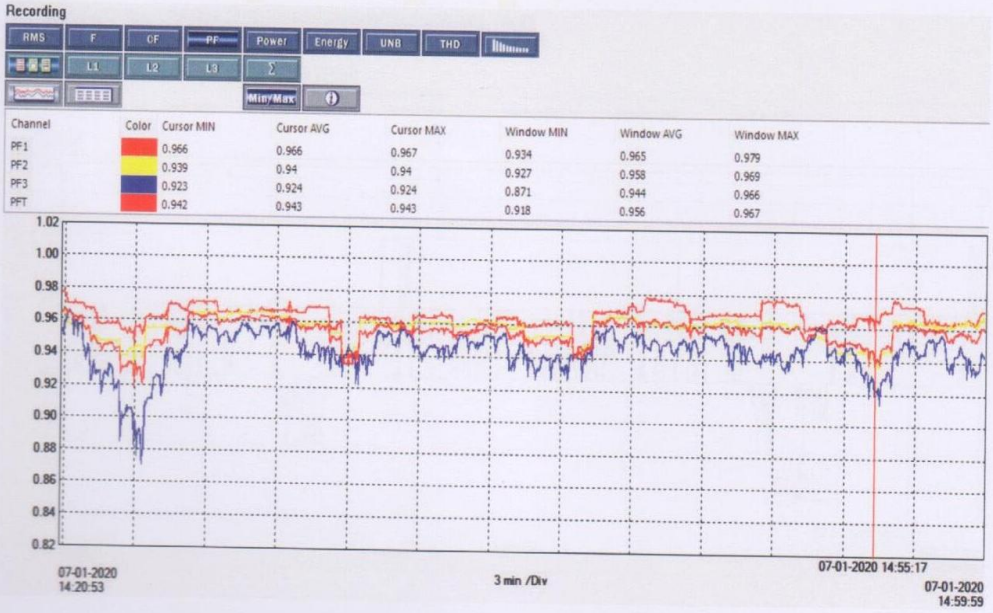
R	Y	B	N-E
144.1 A	144.8 A	151.2 A	31.5 A

1.4. Total Power (KW):

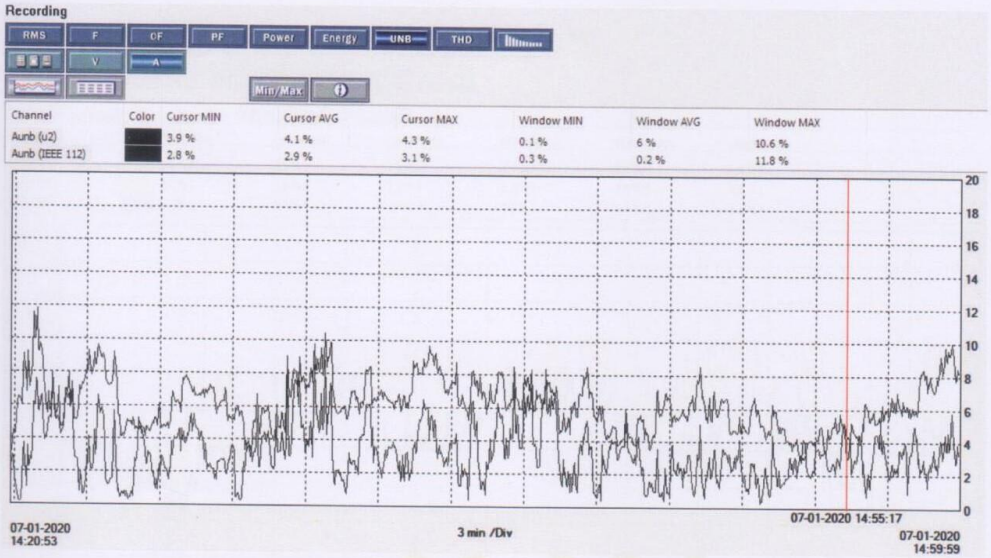


Total Maximum power is 98.8 KW.

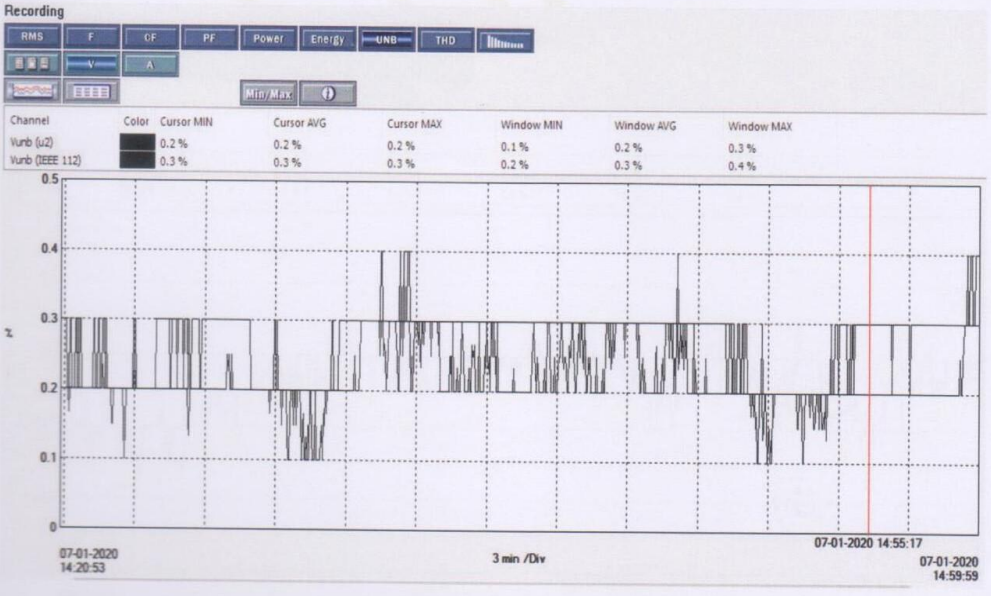
1.5. Power Factor:



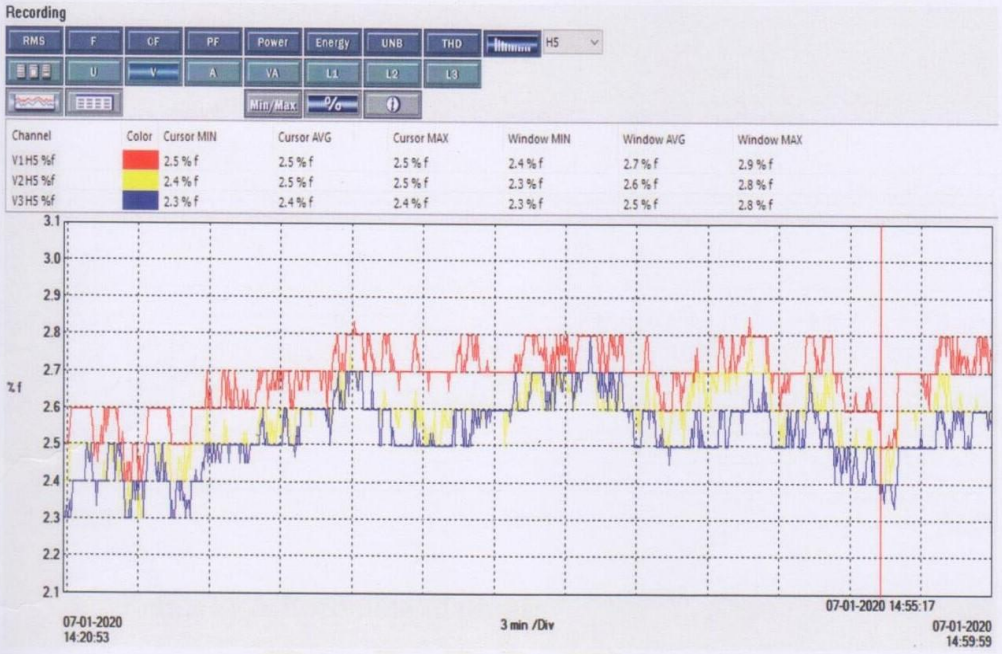
Current Unbalance:

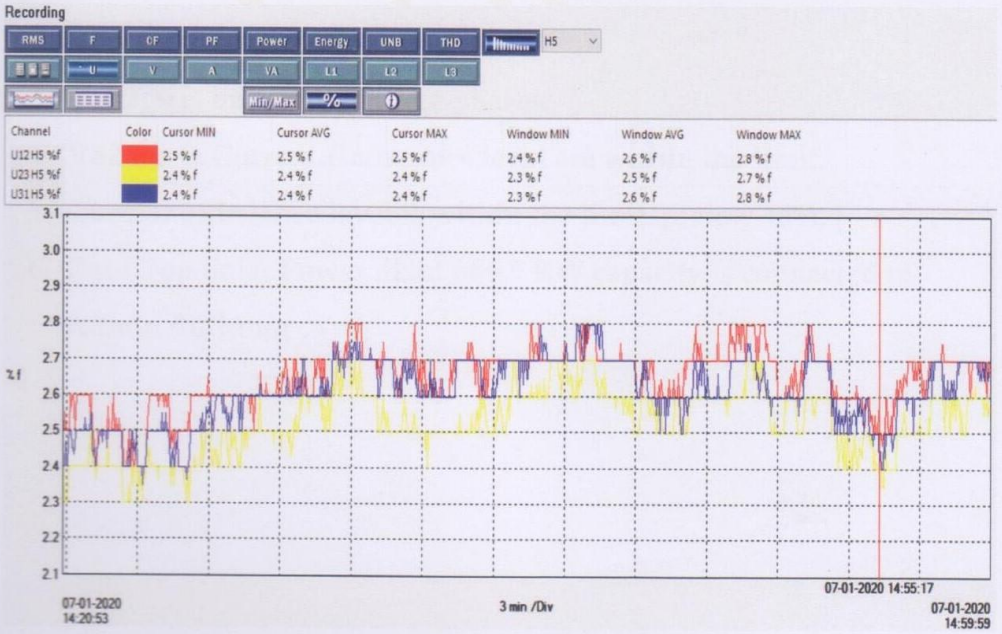


Voltage Unbalance:

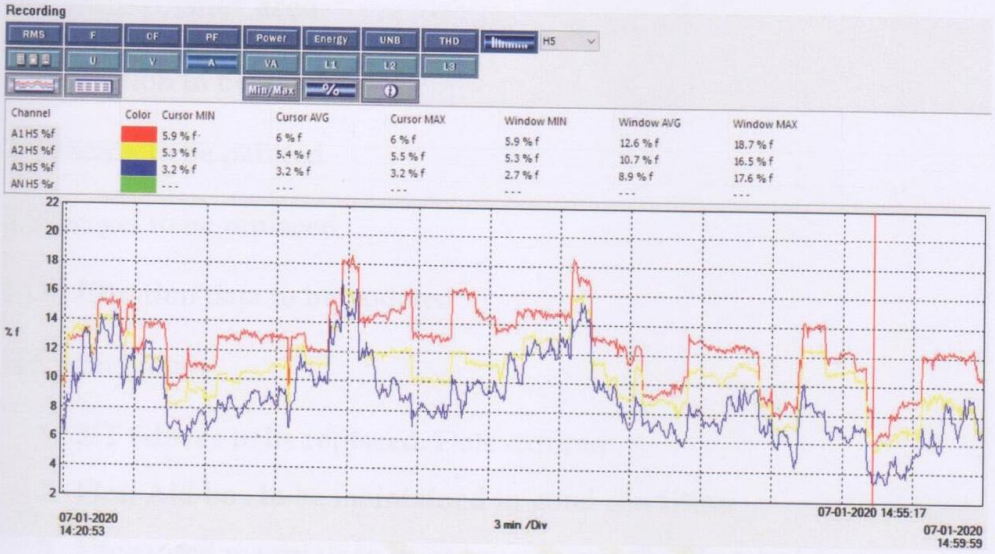


Voltage Harmonics:





Current Harmonics:



1.6. Remarks & Recommendations:

1. Power factor is good . To be maintained above 0.95
2. Power factor penalty-Nil
3. Voltage is balanced in three phases.
4. Voltage & Current Harmonics level are within the limit.
5. Current unbalance level is within the limit. [below 10%.]
6. Roof Top Solar Power plant of 9.9 KW capacity is connected to Admin Building

HT transformer area

1.Vegetation to be removed

2. Fencing to be painted

3.Silicagel to be replaced

4.Oil filtration data to be updated

HT panel room

1. HT Gloves to be replaced. Date expired
2. First Aid box to be maintained in good condition
3. Unwanted materials to be removed from the Electrical room
4. Sand Buckets to be kept with dry free flow sand
5. Fire extinguishers are due for inspection

II. AMILTA BLOCK:

Service No	05-041-011-536	
	Tariff	Sanction Load
	LM 51	8.16 KW

2.1. Phase to Phase Voltage Readings:

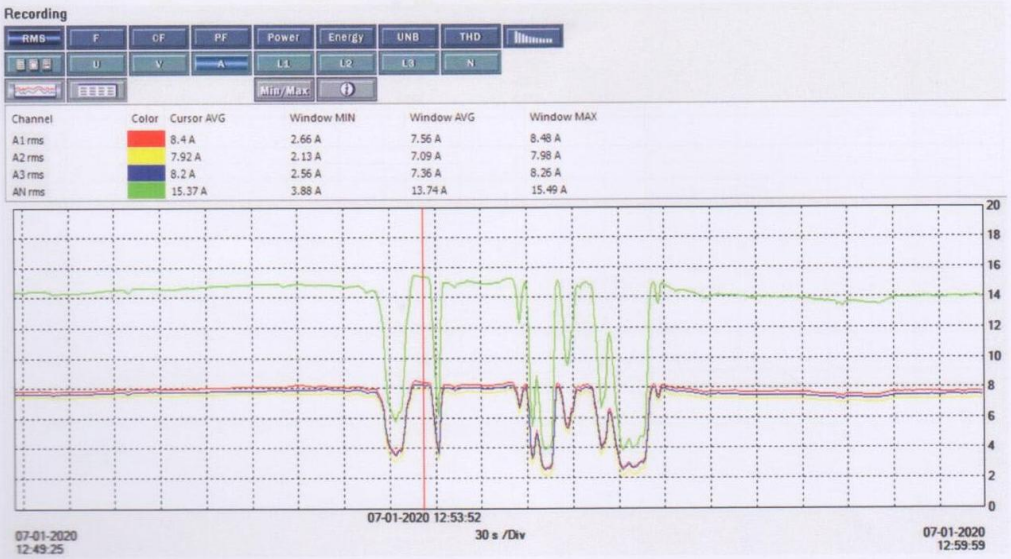
RY	YB	BR
411 V	411.3 V	411.2 V

2.2. Phase to Neutral Voltage Readings:

R-N	Y-N	B-N
236.2 V	236.9 V	239.2 V

2.3. Current Readings:

R	Y	B	N-E
8.4 A	7.92 A	8.2 A	15.37 A

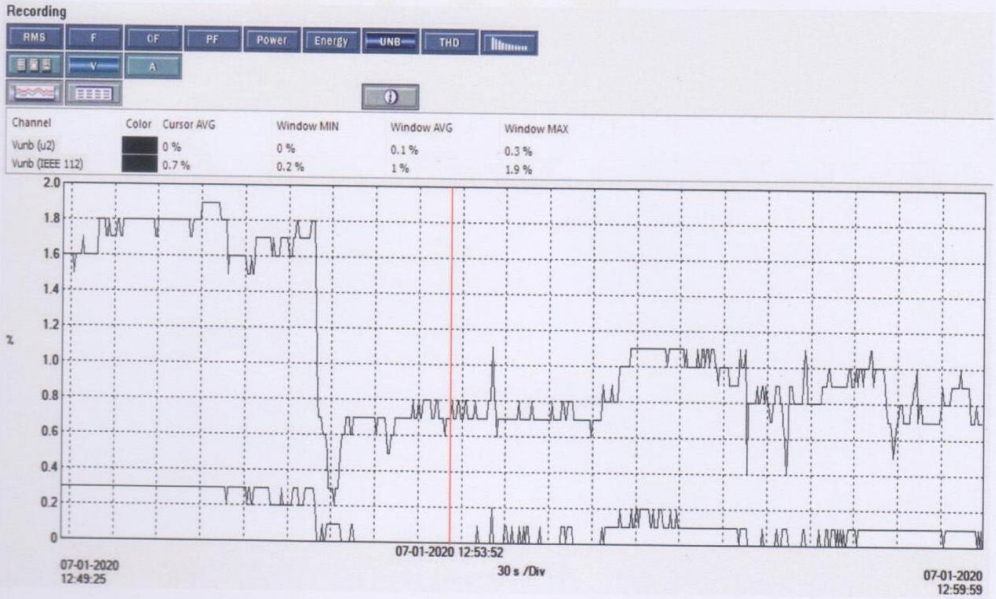


2.4. Total Power(KW):

2.5. Power Factor:

2.5. Unbalance Current:

2.6. Unbalance Voltage:



2.7. Remarks & Recommendations:

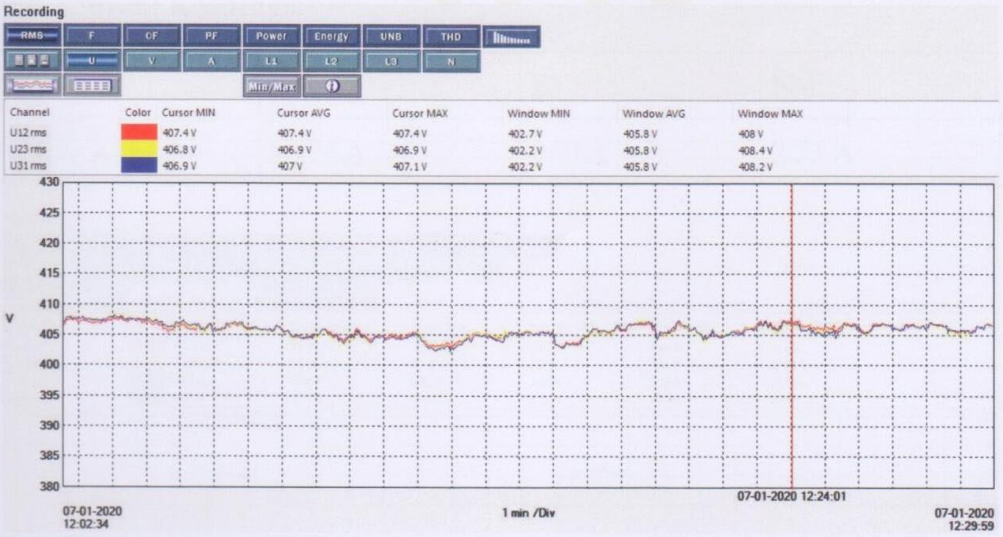
1. During energy audit Power factor is very low 0.694(Average).
   i. R Phase Power Factor is 0.58.
   ii. Y Phase Power Factor is 0.997.
   iii. B Phase Power Factor is 0.709.
2. Average power factor of 0.82 is maintained as per EB bill report.
3. Power factor to be maintained above 0.9
4. Current Unbalance is due to less occupancy during audit.
5. As per last two years power consumption status, the maximum demand reached is 7.82 KW only.(Sanctioned load is 8.16 KW)
6. On Grid Solar Roof Top Power plant of 8 KW capacity is synchronised
7. Solar Bi Directional meter was fixed on 31.07.2019

III. HOSTEL:

Service No	05-041-011-165	
	Tariff	Sanction Load
	LM II B 1	48 KW

3.1. Phase to Phase Voltage Readings:

RY	YB	BR
407.4 V	406.8 V	406.9 V



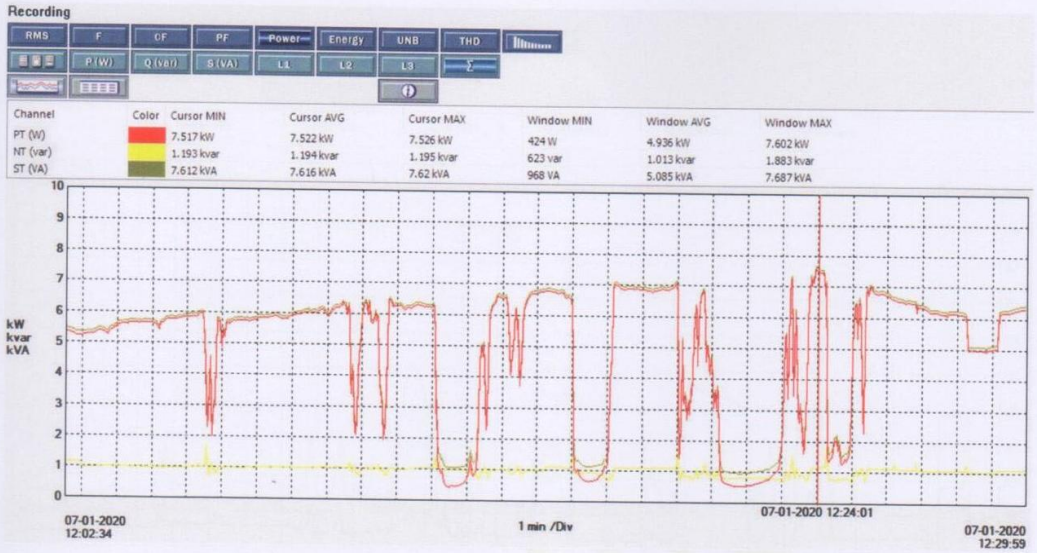
3.2. Phase to Neutral Voltage Readings:

R-N	Y-N	B-N
235.6 V	234.9 V	234.4 V

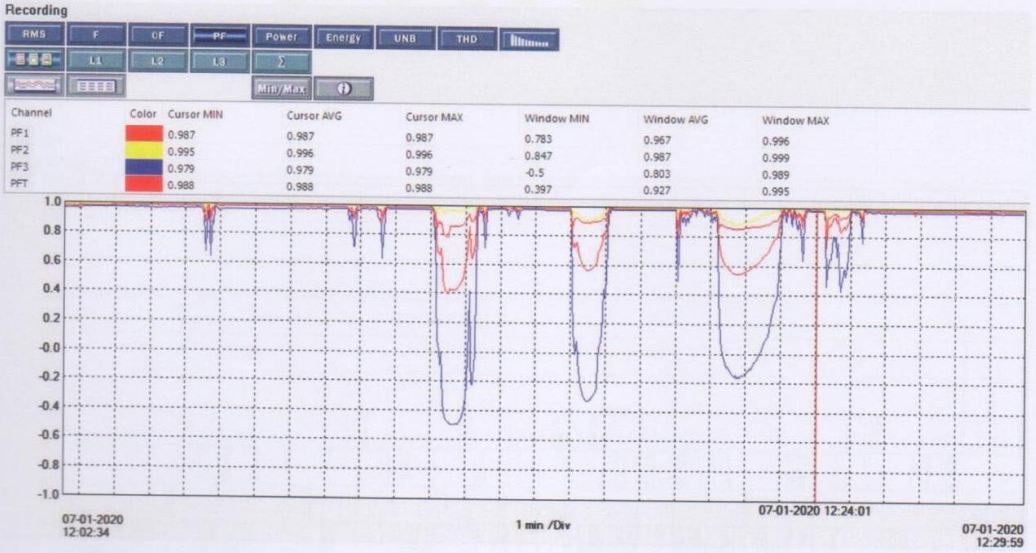
3.4 .Current Readings:

R	Y	B	N-E
11.71 A	10.76 A	9.91A	2.73 A

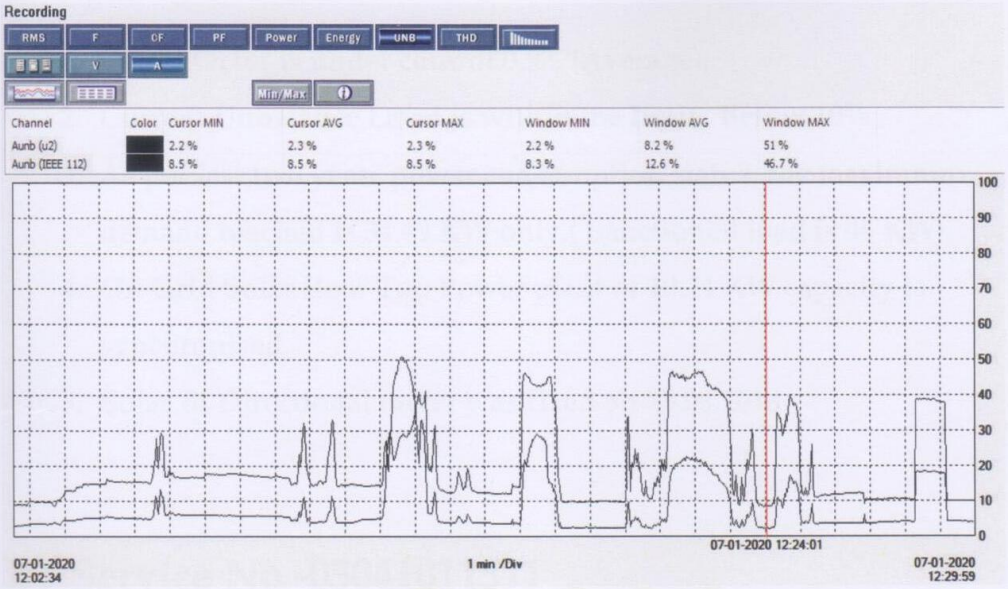
3.5.Total Power (KW):



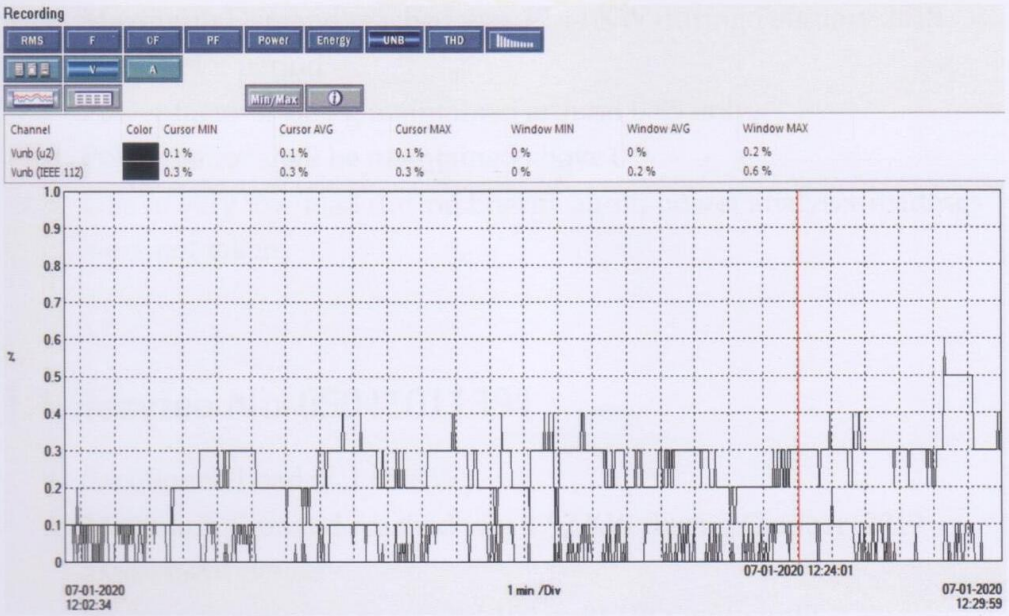
3.5.Power Factor:



3.6.Unbalance Current:



3.7.Unbalance Voltage:



3.8 .Remarks & Recommendations:

1. Power factor is under control 0.927(Average).
2. Current Unbalance Level is within the limit. Below 10%.
3. As per last two years power consumption status, the maximum demand reached is 34.49 KW only.(Sanctioned load is 48 KW)
4. On Grid Solar Roof Top Power plant of 10.24 KW capacity is synchronised
5. Solar Bi Directional meter was fixed on 23.08.2018

LT Service No -05041011571

- Sanctioned Load is 12.64 KW
- Maximum Demand reached was 12.44 KW during February 2018 assessment period
- Power factor is being maintained around 0.85 only.
- Power factor shall be maintained above 0.9
- Due to very low load during Energy audit, power analyser readings were not taken

LT Service No-05041011394

- Sanctioned Load is 1.85 KW
- Maximum Demand reached was 1.92 KW during October 2019 assessment period
- Power consumption is around 100 units/Bi month only

82.5 KVA Generator Room:

- Unwanted Material to be removed from DG area.
- CO_2Fire extinguishers capacities of 2 Kg and 4.5 Kg are due for service
- Earth pit resistance value to be measured and keep tracking it.
- Earth pit identification is required

160 KVA Generator Room:

- Unwanted Material to be removed from DG area.
- CO_2Fire extinguishers capacity of 2 Kg is due for inspection
- Sand buckets to be kept nearby Generator room
- Sand buckets to be kept with dry free flow sand
- Earth pit resistance value to be measured and keep tracking it.
- Earth pit identification is required

275 KVA Generator Room:

- Unwanted Material to be removed from DG area.
- Fire extinguishers 2 Kgs capacities of CO_2 type 2 Nos and 9KG DCP type are due for service
- Sand buckets to be kept with dry free flow sand
- 9KG DCP type fire extinguisher to be kept on wall
- Earth pit identification is required

EB Service K165 room (Hostel)

- In front of fire extinguishers, materials not to be kept
- Fire extinguishers should be easy accessible and operable at any point of time
- Fire extinguishers not to be kept on floor
- In front of Electrical power distribution board, other materials not to be kept and electrical panels should be easy accessible and operable at any point of time
- Broken handle to be replaced in breaker

SAN JOSE BLOCK

Ground Floor UPS room

- Fire Extinguisher to be fixed on wall
- Fire Extinguishers are due for service
- Unwanted materials to be removed from the room
- Petroleum Jelly to be applied on the Battery terminals
- Distilled water to be topped up in batteries

Internet Browsing Centre

- AC air leak through the wooden window to be arrested

Computer Lab

- Fire Extinguishers are due for service

EB Bus Bar Power Room

- Distribution board to be easily accessible
- Room is fully occupied with unwanted materials. To be removed

SANCTA MARIA BLOCK

- AMC details about the UPS and Batteries to be made available.
- 6KG DCP Fire Extinguisher is due for service

WEAT Office Battery Room

- Extinguisher to be provided
- Unwanted materials to be removed from the room

ADMIN BLOCK G Floor Battery Room

- AC cooling coils insulation faults to be rectified

ADMIN BLOCK Dean Office battery room

- 20 KVA UPS system not in service
- All batteries are in dry and non-operable conditions

ADMIN BLOCK Chemistry Lab

- Inverter not in on condition

ADMIN BLOCK Physics Lab

- 3 KVA Inverter not in service

MARINA BLOCK

- 3 KVA Inverter sent for service

BENEDICTA BLOCK Battery Room

- Water entry from outside to be avoided

RO Plant

RO reject water from Admin building and Marina block building are being used for garden.

MARIETTA BLOCK

- Extinguisher kept on stair case. To be kept on wall
- Sand bucket to kept with dry free flowing sand.

Gas cylinder storage area

- Fire Extinguisher not available
- Sand bucket to kept with dry free flowing sand.

Solar Water heater-150LPD

Hot water from Solar water heater is being utilised effectively

Solar Street Lights

Two numbers Solar Street lights (ADMIN BLOCK) are not glowing.

Batteries are in dry condition. To be replaced

Solar Power plants

1. On Grid Solar Roof Top power plant of 9.9 KW at Admin Building

   Solar Power Generation as on 16.12.2019 is 10,835 units

   CO_2 emission avoided so far 6531 Kgs

2. On Grid Solar Roof Top power plant of 10.24 KW at Hostel MADONA BLOCK

   Solar power plant is connected to service Number 05041011165

   Bi directional meter fixed by TNEB on 23.08.2018

   Solar Power Generation as on 07.01.2020 is 7,040 units

   Solar Power Exported to TNEB Grid as on 07.01.2020 is 2519 units (from 23.08.2018)

   CO_2 emission avoided so far 1511 Kgs

3. On Grid Solar Roof Top power plant of 8 KW at Hostel AMALITTA BLOCK

   Solar power plant is connected to service Number 05041011536

   Bi directional meter fixed by TNEB on 31.07.2019

   Solar Power Generation as on 07.01.2020 is 3,316 units

   Solar Power Exported to TNEB Grid as on 07.01.2020 is 1,219 units (from 31.07.2019)

   CO_2 emission avoided so far 731 Kgs

4. Off Grid Solar Roof Top power plant of 1.92 KW at Hostel MARIETTA BLOCK

Bio Gas Plant

Biogas output - 20M³/ Day

Food/Vegetable waste -150 KG/Day

LPG Equivalent-10KG/Day

CO_2 Offset -68985 to 76650 KG /Year

Bio gas generation as on 17.12.2019 is 1334 M³

Lightning arrestor

Lightning arrestor system provided inside the campus in the following building top

ADMIN BLOCK Entrance

GOLDEN JUBLIEE HALL

MARINA BLOCK

MAUREEN BLOCK

ADMIN BLOCK Solar Power plant area

MADONA BLOCK Solar Power Plant area

AMALITTA BLOCK Solar Power Plant area

Physical verification of Lightning arrestor continuity checked. Ok

Energy Saving activities implemented

1.ADMIN BLOCK all fans are replaced with Energy saving Super fans

2.ADMIN BLOCK all conventional tube lights are replaced with LED tube lights

3.Hostel AMALITTA BLOCK all rooms are provided with Energy saving Super fans

4.Hostel

AMALITTA BLOCK,
MADONA BLOCK ,
ANNUNCIATA BLOCK
MARIETTA BLOCK

} All rooms are provided with LED tube lights

5.On Grid Solar Roof Top power plant of 9.9 KW at ADMIN BLOCK

6. On Grid Solar Roof Top power plant of 10.24 KW at Hostel MADONA BLOCK

7. On Grid Solar Roof Top power plant of 8 KW at Hostel AMALITTA BLOCK

8. Off Grid Solar Roof Top power plant of 1.92 KW at Hostel MARIETTA BLOCK

9.Solar Water Heater capacity of 150Liters per Day

10. Solar Street Lights -10 Nos

11.Bio Gas plant at Hostel Mess - Biogas output - $20M^3$/ Day

12.Three Rainwater storage pits having capacity of 9000 Cuft, 3600 Cuft and 720 Cuft are being utilised effectively

13. RO reject water is being used for garden

Energy Saving Potentials

- Balance conventional Fans shall be replaced with energy efficient fans in periodical manner
- Left over Conventional Tube lights shall be replaced with LED tube lights in spaced manner
- Additional solar power plant shall be planned
- Solar water heater shall be planned for preheating before cooking in Hostel and canteen
- Energy efficient Air conditioner shall be planned in future (5 star rating)
- Existing 1.92 KW off grid solar power plant to be utilised effectively
- By creating more awareness among students and all teaching & non-teaching staffs about the importance of energy savings , fans and tube lights shall be used efficiently
- Halogens lamps shall be replaced with LED lights

General Recommendations:

Battery Room:

1. History card to be maintained for all UPS and batteries. Distilled water to be added periodically to avoid dry condition and failure.
2. Battery Purchase details, Warranty periods to be maintained.
3. Petroleum Jelly to be applied on Battery terminals to avoid corrosion
4. Combustible Materials not to be kept inside Battery room.
5. Unwanted materials to be removed from battery room.
6. Battery room to be kept neat & clean.
7. Cable identification tag to be provided.
8. Proper ventilation to be ensured
9. Extinguisher to be kept on wall
10. Extinguishers to be easily accessible
11. Extinguishers to be inspected on regular basis

General Awareness Programmes:

1. More display on Water conservation awareness shall be put.
2. Energy conservation program for all staffs shall be planned.
3. Hands on training to operate Fire Extinguishers shall be given to all teaching and non-teaching staffs.
4. Availability and Locations of Fire Extinguishers, Hose Reel & Sand Buckets shall be displayed
5. Display on Emergency contact numbers shall be posted on prominent places.