23RD ANNUAL PQSYNERGY INTERNATIONAL CONFERENCE AND EXHIBITION 2025

AISSMS
INSTITUTE OF INFORMATION TECHNOLOGY
(IOIT)
ADDING VALUE TO ENGINEERING
An Autonomous Institute Affiliated to Savitribai Phule Pune University
Approved by AICTE, New Delhi and Recognised by Govt. of Maharashtra
Accredited by NAAC with "A+" Grade | NBA - 5 UG Programmes

DEVELOPMENT OF POWER QUALITY MONITORING SYSTEM FOR COMPLIANCE WITH PQ REGULATIONS IN MAHARASHTRA STATE (INDIA) : CASE STUDY OF AISSMS IOIT CAMPUS

MONDAY, 08 SEPTEMBER 2025

Sachin Shelar
Head - Power Quality Cell
Asst. Professor
Department of Electrical Engineering
AISSMS IOIT, Pune

Co-Authors
Dr. Deepak Bankar *(Bharati Vidyapeeth (Deemed to be University) College of Engineering, Pune, India)*
Hari Balasubramanian *(Janitza Electronics, Chennai, India)*

Brief Profile : Prof. Sachin Shelar

- B.E. Electrical (**Gold Medalist**) **1998**
- M.E. (Power System)(**First Rank)** COEP **2004**
- Ph.D. (**Power Quality**) Pursuing
- **Head of Power Quality Cell (Dept. of Electrical Engg, AISSMS IOIT, Pune)**
- **Member (Co-opt) BIS - Electromagnetic Compatibility Sectional Committee (LITD 09)**
- **Member IEC TR 63222-102 - Developing Networks toward Power Quality Standards**
- **3 Years Industrial** & **25 Years teaching** experience
- Conducted more than **400+ Power Quality audits**.
- **Ex. Chairman** of the subject "**Power Quality Management**" (**Savitribai Phule Pune University**)
- Published over **30 papers** at national and international level and has authored **3 books**
- Recently established state-of-the-art "**D. M. Tagare Power Quality Experience Center**" **worth ₹ 1.5 Crore** at AISSMS's IOIT Pune.

This Power Quality Center is the first of its kind in India.

sachin.shelar@aissmsioit.org

Contents

- Power Quality **Monitoring**
- **PQ Regulations** in India
- **Maharashtra State** PQ Regulation
- **Introduction** to Case Study
- Hardware - **Class A PQ meter**
- **Software** for PQ monitoring
- Results (**Dashboards**)

What you don’t know

is hurting you !

“Proverb”

PQ Monitoring

Power quality monitoring is the process of gathering, analyzing, and interpreting raw measurement data into useful information

PQ Monitoring Considerations

- Characterize system performance (**Benchmarking / Compliance**)
- Characterize specific problems
- Predictive or just-in-time maintenance

Source : Book- Electrical Power Systems Quality – Dugan et. al.

PQ Regulations / Standard in India (As on Aug 2025)

Forum of Regulators

- **August 2018**
- Model Regulation on Power Quality for State

Central Electricity Authority

- **February 2019**
- Technical Standards for Connectivity to the Grid regulations

Indian Standard

- **IS 17036 : 2018**
- Distribution System Supply **Voltage Quality**

Assam State

- **Feb. 2020 (Draft)**
- Draft Assam Electricity Regulatory Commission (**Power Quality** for Distribution System) Regulations, 2020

Maharashtra State

- **Feb. 2021**
- Electricity Supply Code and Standards of Performance of Distribution Licensees Including **Power Quality**) Regulations 2021"

Indian Standard

- **IS 18475 : 2023**
- **Power Quality** Measurement and Monitoring - Methods

Punjab State

- **March 2023**
- Punjab State Electricity Regulatory Commission **(Power Quality)** Regulations, 2023

Tamilnadu State

- **July 2024 (Draft)**
- Draft amendments to the Tamil Nadu Electricity Supply Code

Madhya Pradesh State

- **Jan. 2025**
- Madhya Pradesh State Electricity Regulatory Commission (**Power Quality**) Regulations, 2025

Karnatka State

- **Jan. 2025 (Draft)**
- Draft Karnataka Electricity Distribution Code (KEDC), 2024

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Maharastra State PQ Regulations (Feb 2021)

Distribution Licensee

1. Supply voltage **variations**
2. Supply voltage **flicker**
3. Supply voltage **unbalance**
4. Supply voltage **dips** and **swells**
5. Supply voltage individual **harmonics** and voltage **THD**
6. Supply **Interruptions**

Designated Consumers

1. Current individual **harmonics** and current **TDD**

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Supply Voltage Variation

Maharastra State PQ Regulations (Feb 2021)

Table 1: Supply Voltage Variation Limits for Low Voltage and High Voltage

Supply Voltage Characteristic	Reference Time Frame	Limits
Mean r.m.s. value of the supply voltage over 10 min	100% of time	*U*n +10 % / -15 %

Table 2: Supply Voltage Variation Limits for Extra-high Voltage

Supply Voltage Characteristic	Reference Time Frame	Limits
Mean r.m.s. value of the supply voltage over 10 Min	100% of time	As specified by Central Electricity Authority/CERC

For statistical evaluation, voltage variations shall be assessed for the period not less than 7 continuous days.

Supply Voltage Flicker

Maharastra State PQ Regulations (Feb 2021)

Supply Voltage Characteristic	Reference Time Frame	Limits
Long Term flicker severity P_{lt} caused by voltage fluctuation	95% of each period of one week	≤ 1

Supply Voltage Unbalance

Maharastra State PQ Regulations (Feb 2021)

Supply Voltage Characteristic	Reference Time Frame	Limits
Ratio of r.m.s value of negative phase sequence component (fundamental) to the r.m.s value of positive phase sequence component (fundamental) of the supply voltage	95% of each period of one week	≤ 2 percent

Supply Voltage dips (Sag)

Maharastra State PQ Regulations (Feb 2021)

280

Number of Events per Year

Residual Voltage (%)	Duration t (ms)				
	$10 \leq t \leq 200$	$200 < t \leq 500$	$500 < t \leq 1000$	$1000 < t \leq 5000$	$5000 < t \leq 60000$
$90 > u \geq 80$	30	40	10	5	5
$80 > u \geq 70$	30	40	5	5	5
$70 > u \geq 40$	10	40	5	5	5
$40 > u \geq 5$	5	20	5	5	5

Short Voltage Interruptions

Maharastra State PQ Regulations (Feb 2021)

75

Residual Voltage (%)	Duration t (ms)				
	10 ≤ t ≤ 200	200 < t ≤ 500	500 < t ≤ 1000	1000 < t ≤ 5000	5000 < t ≤ 180000
5 > u	5	20	30	10	10

Short Voltage Harmonics

[As per IS 17036]

Maharastra State PQ Regulations (Feb 2021)

Supply Voltage Characteristic	Reference Time Frame	Limits
Mean root mean square (r.m.s.) values of each individual harmonic voltage measured over 10 min	95 percent of each period of one week	*See* Table 10
	Remaining 5 percent of time	No limits
THD	100 percent of time	≤ 8 percent

Table 10 Values of Individual Harmonic Voltages of the Supply Voltage in Percent of the Fundamental Voltage (U1)

Odd Multiple of Harmonics (Percent)								Even Harmonics (Percent)			
Not Multiples of 3				Odd Multiples of 3							
h (harmonic order)	LV	MV	HV	h (harmonic order)	LV	MV	HV	h (harmonic order)	LV	MV	HV
5	6	6	5	3	5	5	3	2	2	2	1.9
7	5	5	4	9	1.5	1.5	1.3	4	1	1	1
11	3.5	3.5	3	15	0.5	0.5	0.5	6 to 24	0.5	0.5	0.5
13	3	3	2.5	21	0.5	0.5	0.5				
17	2	2									
19	1.5	1.5									
23	1.5	1.5									
25	1.5	1.5									

Recommended Minimum Assessment Periods and Frequency of Reporting

IS 18475 : 2023

Power Quality Measurement and Monitoring — Methods

Sl No.	Parameter	Minimum Assessment Period	Recommended Frequency of Reporting to Authorities
(1)	(2)	(3)	(4)
i)	Supply frequency	1 week	Quarterly
ii)	Magnitude of supply voltage	1 week	Monthly
iii)	Single rapid voltage change	Under consideration	Under consideration
iv)	Flicker	1 week	Quarterly
v)	Supply voltage unbalance	1 week	Quarterly
vi)	Harmonic voltages	1 week	Quarterly
vii)	Interharmonic voltages	Under consideration	Under consideration
viii)	Main signalling voltages	1 day	Quarterly
ix)	Voltage interruptions	1 year	Yearly with monthly sliding window
x)	Dips and swells	1 year	Yearly with monthly sliding window
xi)	Magnitude of current	1 week	Quarterly
xii)	Current unbalance	1 week	Quarterly
xiii)	Current harmonic	1 week	Quarterly
xiv)	Current inter-harmonic	Under consideration	Under consideration

Current individual harmonics and current TDD

[As per IEEE 519]

Maharastra State PQ Regulations (Feb 2021)

Maximum harmonic current distortion in percent of I_L						
Individual harmonic order[b]						
I_{SC}/I_L	$2 \le h < 11$[a]	$11 \le h < 17$	$17 \le h < 23$	$23 \le h < 35$	$35 \le h \le 50$	TDD
< 20[c]	4.0	2.0	1.5	0.6	0.3	5.0
20 < 50	7.0	3.5	2.5	1.0	0.5	8.0
50 < 100	10.0	4.5	4.0	1.5	0.7	12.0
100 < 1000	12.0	5.5	5.0	2.0	1.0	15.0
> 1000	15.0	7.0	6.0	2.5	1.4	20.0

Case Study

PQ Monitoring System

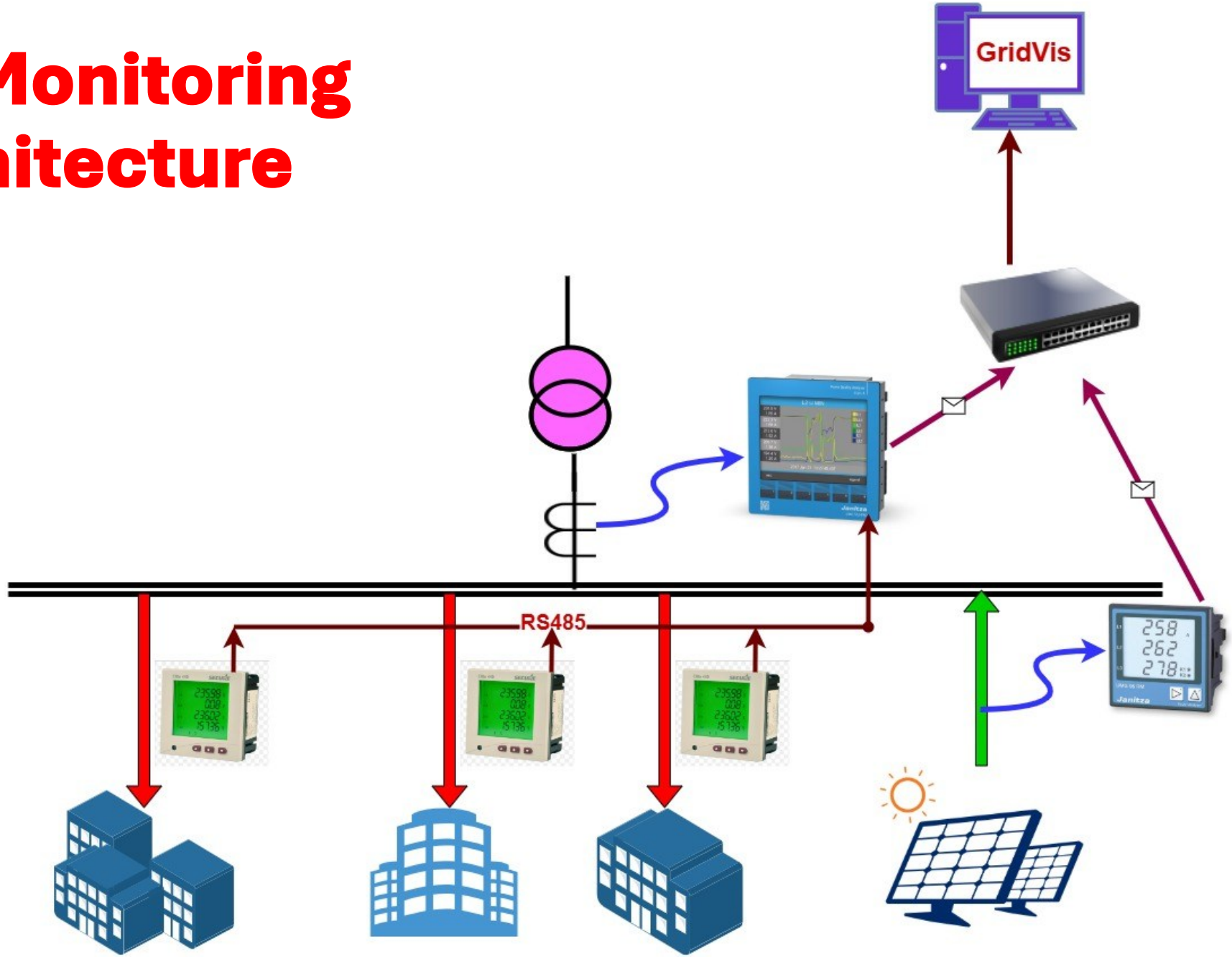
at

AISSMS Institute of Information Technology, Pune (India)

sachin.shelar@aissmsioit.org

Premier Heritage Group of Institutes (Est. 1917)

PQ Monitoring Architecture



Class A PQ Meter

Measurement process in accordance with **IEC 61000-4-30 : Class A**

Continuous sampling of the voltage and current measurement inputs at **25.6 kHz (512 Samples per cycle**)

Harmonics analysis up to the **63rd harmonic**, even / odd absolute value

Distortion factor **THD-U / THD-I / TDD** (Calcualted / measured in meter)

Flicker measurement in accordance with DIN **EN 61000-4-15**

Short-term interruptions **(> 10 ms**)

Configurable memory including 3 sec (as per **IEEE 519**)

Logging and storage of transients **(> 39 µs)**

High resolution colour graphical display 320 x 240, 256 colours, 6 buttons

sachin.shelar@aissmsioit.org

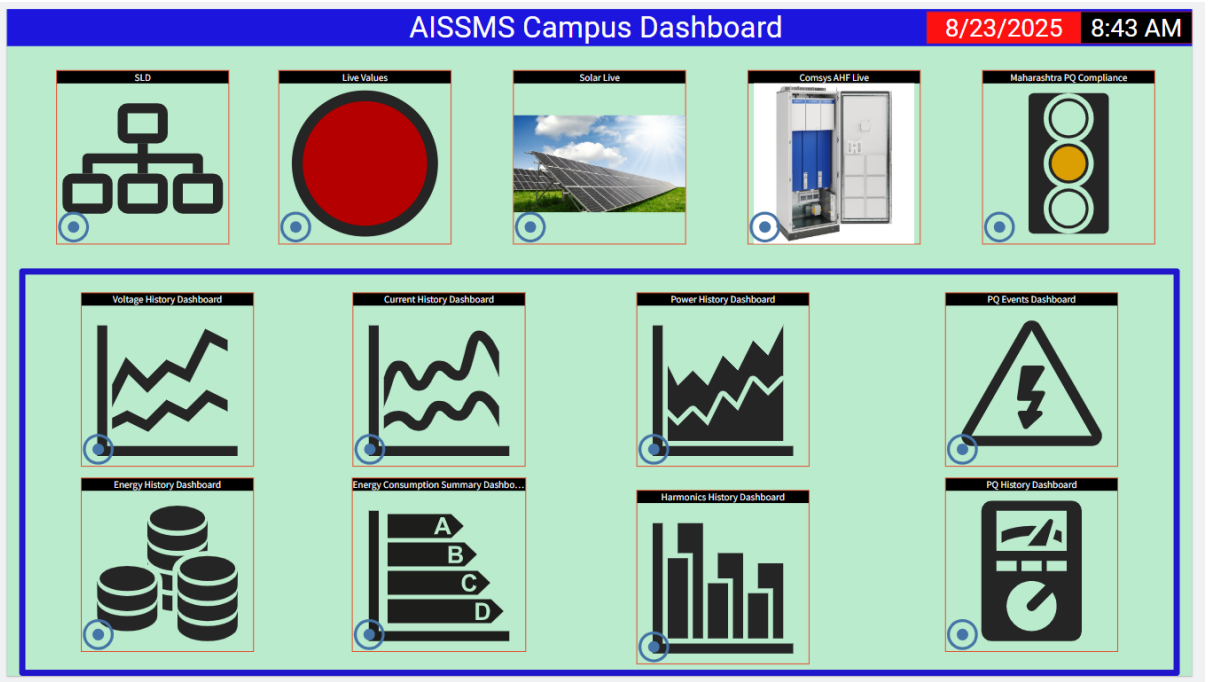
PQ Analysis Software

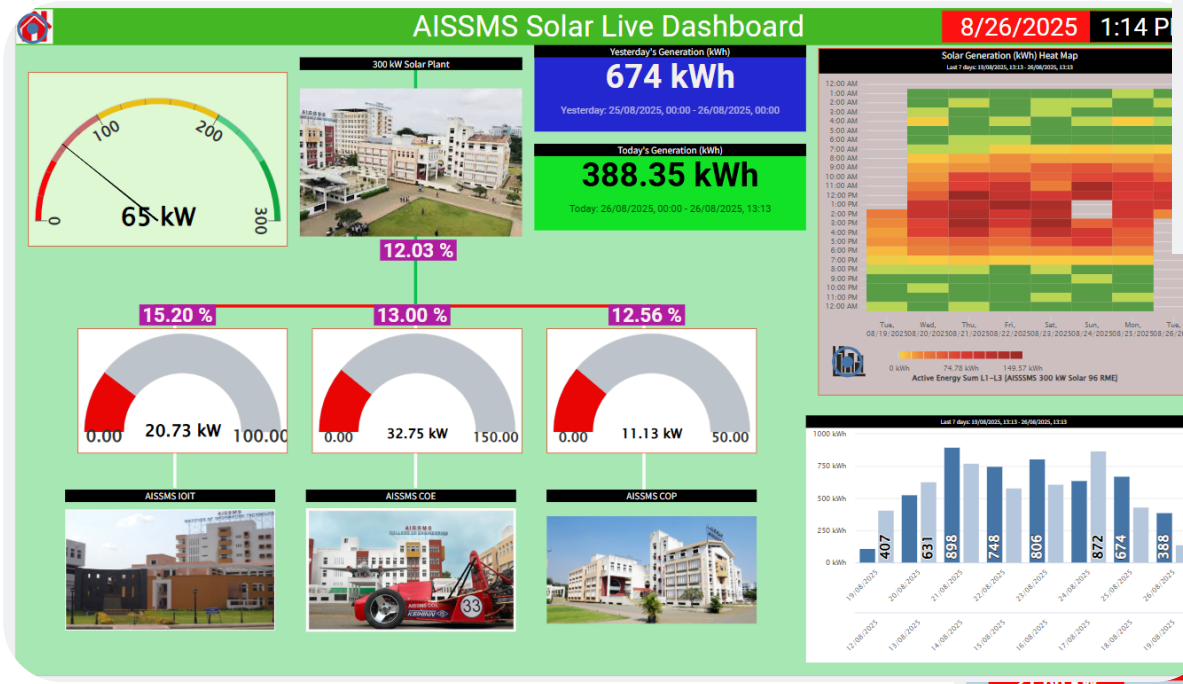
Janitza®

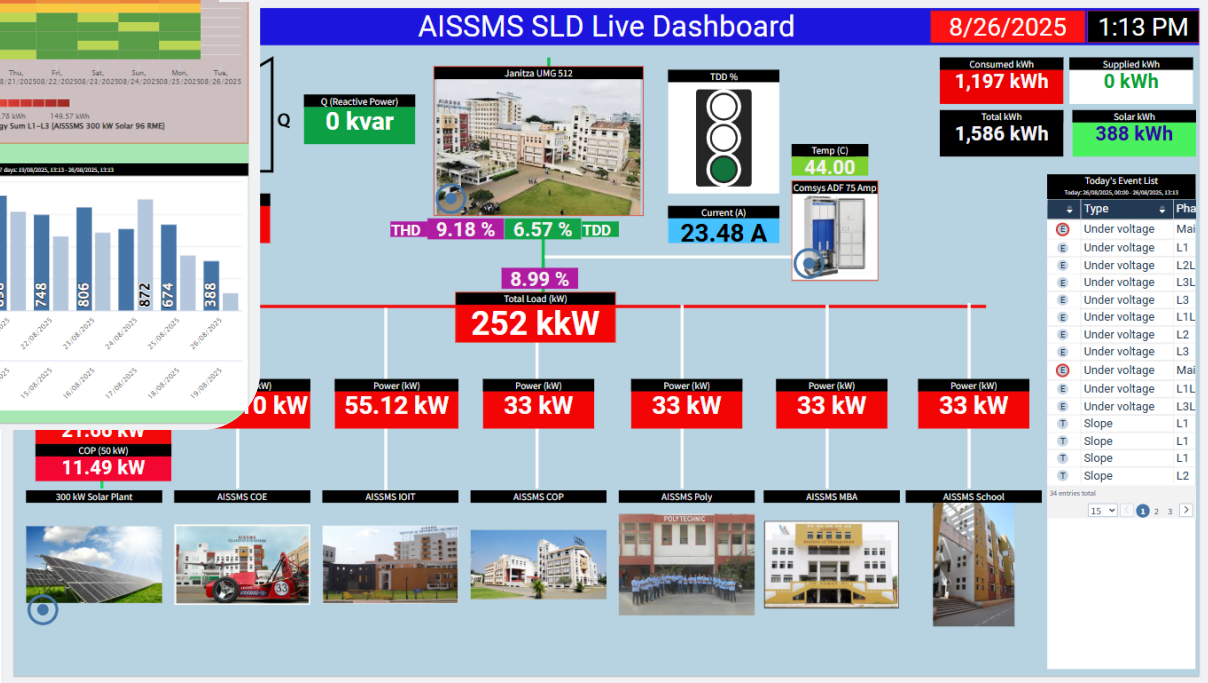
- Energy management
  Certified according to ISO 50001.
- 24/7 Energy Monitoring
- Clear and customized Dashboards
- Customize Reports
- Safety & Alarm management
- Network analysis & Evaluation
- Connectivity

sachin.shelar@aissmsioit.org

PQ Dashboards







sachin.shelar@aissmsioit.org

AISSMS Campus Dashboard

8/23/2025 8:43 AM

SLD

Live Values

Solar Live

Comsys AHF Live

Maharashtra PQ Compliance

Voltage History Dashboard

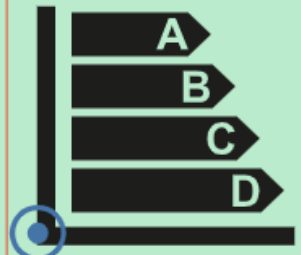
Current History Dashboard

Power History Dashboard

PQ Events Dashboard

Energy History Dashboard

Energy Consumption Summary Dashbo...



Harmonics History Dashboard

PQ History Dashboard

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Live

AISSMS SLD Live Dashboard

8/26/2025 1:13 PM

S (Active Power) 187 kVA

S, Q, φ, P

Q (Reactive Power) 0 kvar

P (Active Power) 186 kW

Janitza UMG 512

THD 9.18 % 6.57 % TDD

8.99 %

TDD %

Current (A) 23.48 A

Temp (C) 44.00

Comsys ADF 75 Amp

Consumed kWh 1,197 kWh

Supplied kWh 0 kWh

Total kWh 1,586 kWh

Solar kWh 388 kWh

Total Load (kW) 252 kkW

11.69 %

Power (kW) 66 kW

COE (150 kW) 33.38 kW

IOIT (100 kW) 21.66 kW

COP (50 kW) 11.49 kW

300 kW Solar Plant

Power (kW) 188.10 kW

AISSMS COE

Power (kW) 55.12 kW

AISSMS IOIT

Power (kW) 33 kW

AISSMS COP

Power (kW) 33 kW

AISSMS Poly

Power (kW) 33 kW

AISSMS MBA

Power (kW) 33 kW

AISSMS School

Today's Event List

Today: 26/08/2025, 00:00 - 26/08/2025, 13:13

	Type	Pha
E	Under voltage	Mai
E	Under voltage	L1
E	Under voltage	L2L
E	Under voltage	L3L
E	Under voltage	L3
E	Under voltage	L1L
E	Under voltage	L2
E	Under voltage	L3
E	Under voltage	Mai
E	Under voltage	L1L
E	Under voltage	L3L
T	Slope	L1
T	Slope	L1
T	Slope	L1
T	Slope	L2

34 entries total

15 1 2 3

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Live

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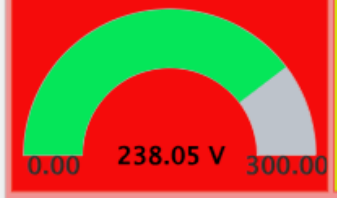
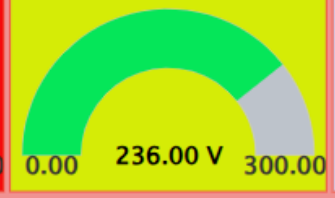
8/26/2025 1:13 PM

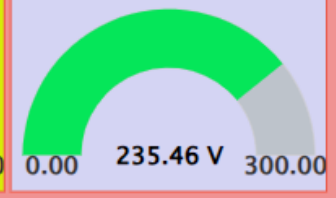
Phase Voltage (V-R)



Phase Voltage (V-Y)



Phase Voltage (V-B)



Line Voltage (V-RY)

411.40 V

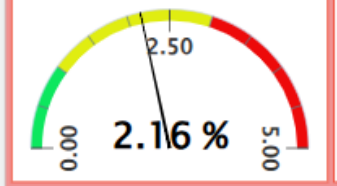
Line Voltage (V-YB)

406.80 V

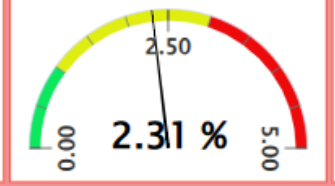
Line Voltage (V-BR)

410.61 V

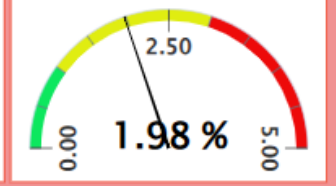
THD (%) R-Phase



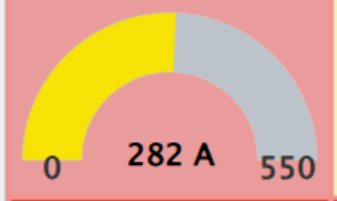
THD (%) Y-Phase



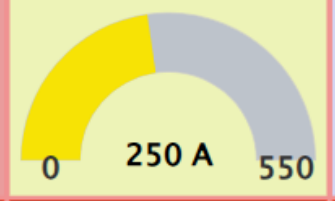
THD (%) B-Phase



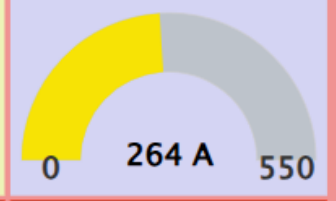
R-Phase Current



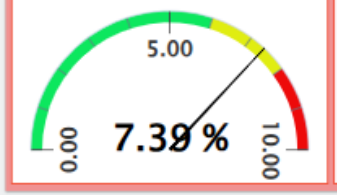
Y-Phase Current



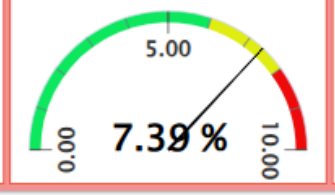
B-Phase Current



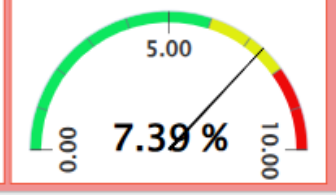
TDD (%) R-Phase



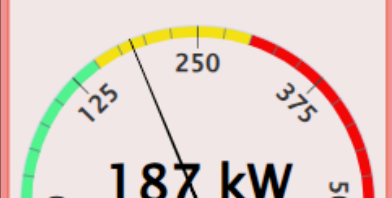
TDD (%) Y-Phase



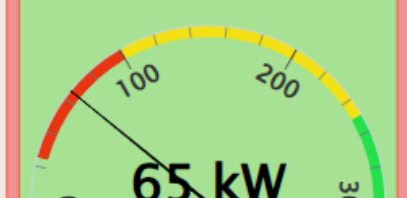
TDD (%) B-Phase



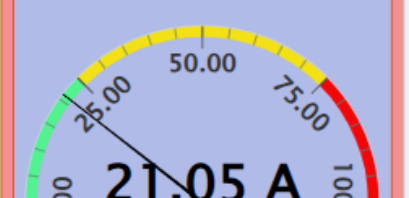
Active Power - P (kW)



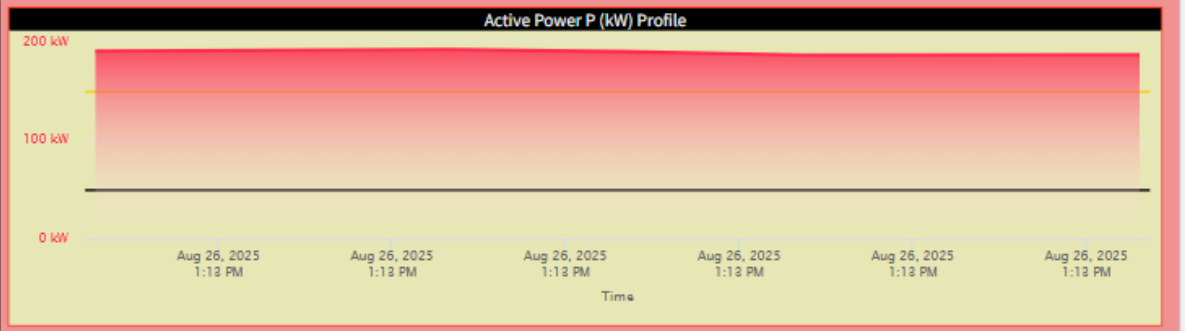
Solar Power - (kW)



Harmonic Filter Current



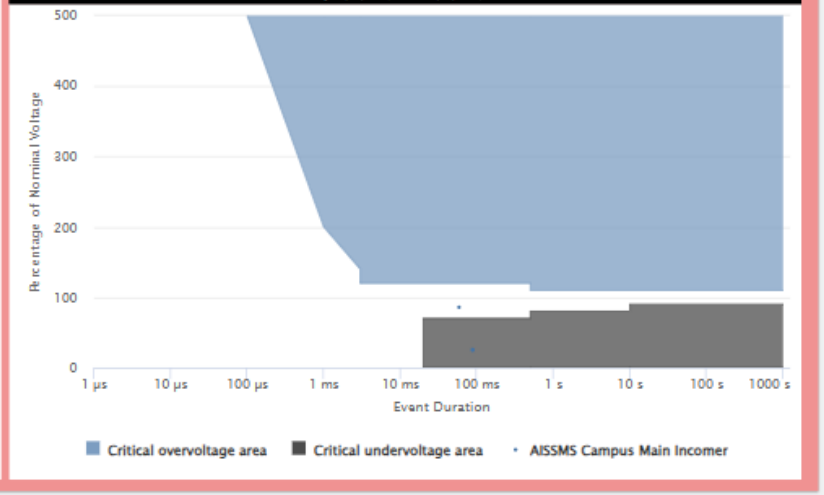
Active Power P (kW) Profile



TDD %

ITI(CBEMA) curve

Today: 26/08/2025, 00:00 - 26/08/2025, 13:13

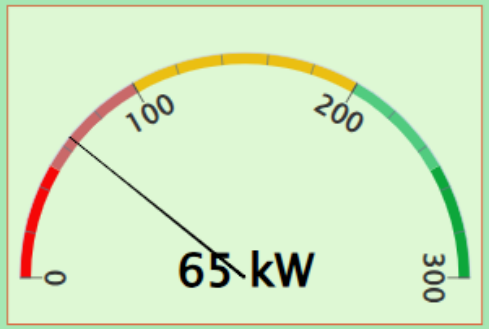


sachin.shelar@aissmsioit.org

Live

AISSMS Solar Live Dashboard

8/26/2025 1:14 PM



300 kW Solar Plant

12.03 %

Yesterday's Generation (kWh)

674 kWh

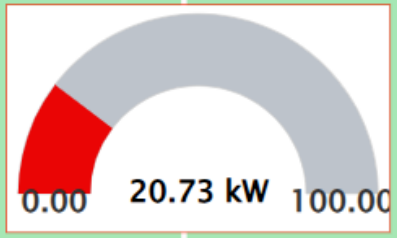
Yesterday: 25/08/2025, 00:00 - 26/08/2025, 00:00

Today's Generation (kWh)

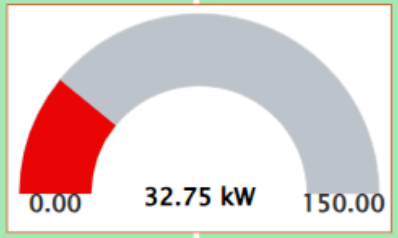
388.35 kWh

Today: 26/08/2025, 00:00 - 26/08/2025, 13:13

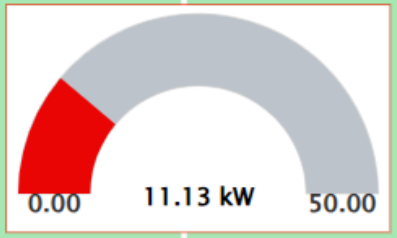
15.20 %



13.00 %



12.56 %



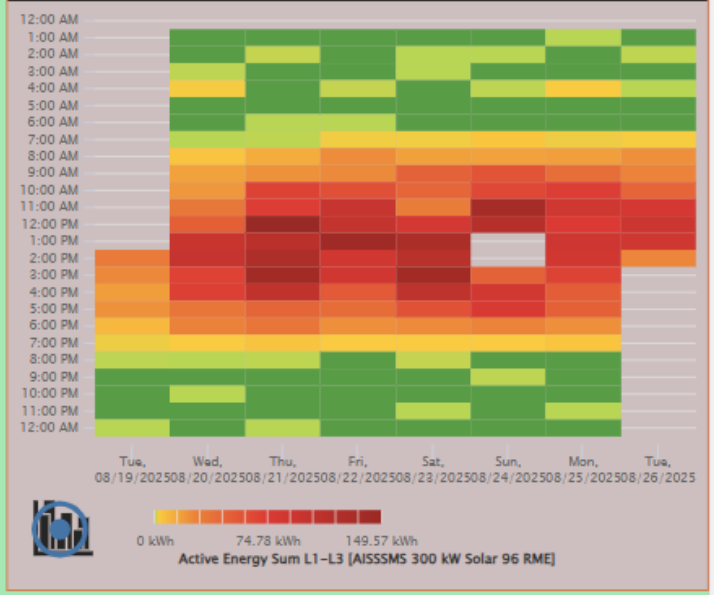
AISSMS IOIT

AISSMS COE

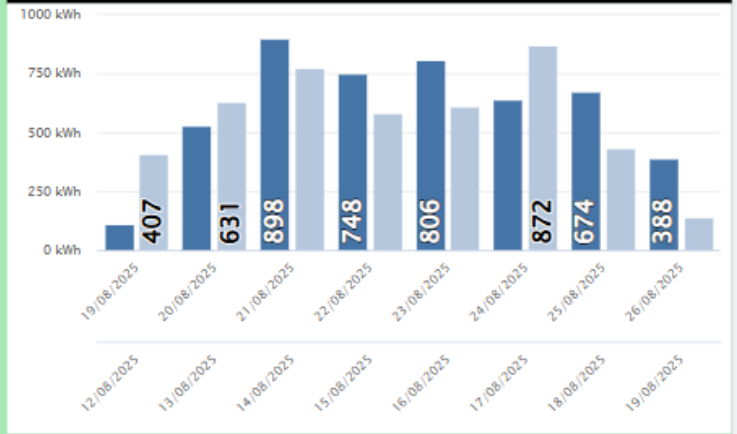
AISSMS COP

Solar Generation (kWh) Heat Map

Last 7 days: 19/08/2025, 13:13 - 26/08/2025, 13:13



Last 7 days: 19/08/2025, 13:13 - 26/08/2025, 13:13



sachin.shelar@aissmsioit.org

Historical Dashboards

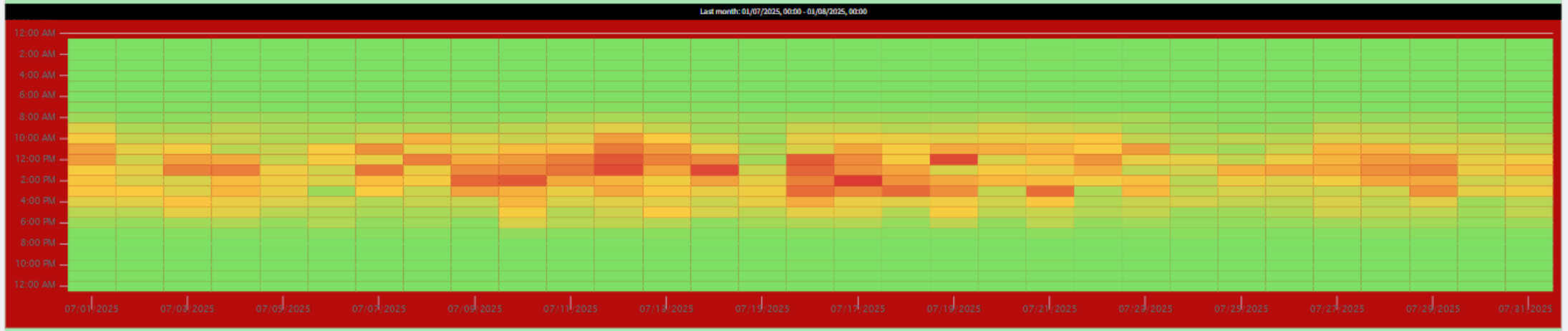
sachin.shelar@aissmsioit.org

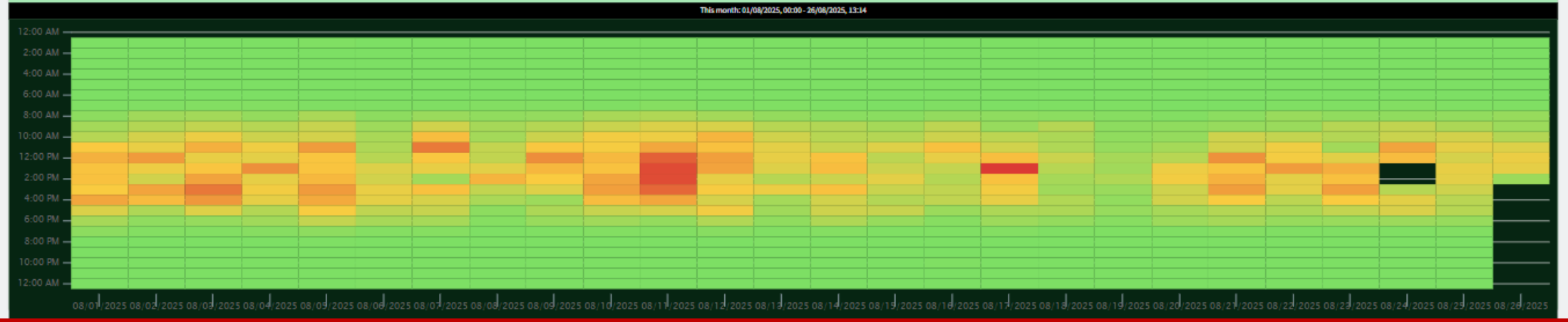
Historical

AISSMS Solar Heatmap Dashboard

8/26/2025 1:14 PM

Last Years Generation (kWh)	This Year Generation (kWh)	Last Month's Generation (kWh)	This Month's Generation (kWh)	Yesterday's Generation (kWh)	Today's Generation (kWh)
113,749 kWh	221,320 kWh	23,991 kWh	19,967 kWh	674 kWh	388 kWh
Last year: 01/01/2024, 00:00 - 01/01/2025, 00:00	This year: 01/01/2025, 00:00 - 26/08/2025, 13:14	Last month: 01/07/2025, 00:00 - 01/08/2025, 00:00	This month: 01/08/2025, 00:00 - 26/08/2025, 13:14	Yesterday: 25/08/2025, 00:00 - 26/08/2025, 00:00	Today: 26/08/2025, 00:00 - 26/08/2025, 13:14
There are only about 32% of raw data in the chosen time range					





sachin.shelar@aissmsioit.org

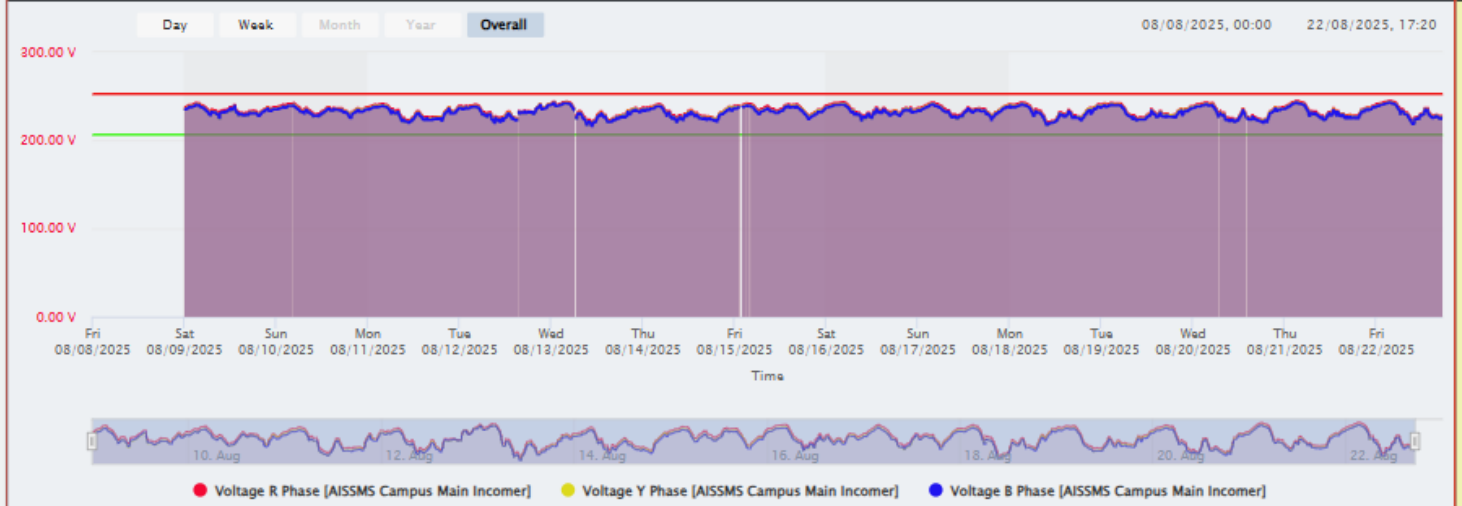
Historical

AISSMS PQ (Voltage) Dashboard

8/23/2025 8:46 AM

Phase Voltage Profile

Last 14 completed days: 09/08/2025, 00:00 - 23/08/2025, 00:00



Event List

Last 14 completed days: 09/08/2025, 00:00 - 23/08/2025, 00:00

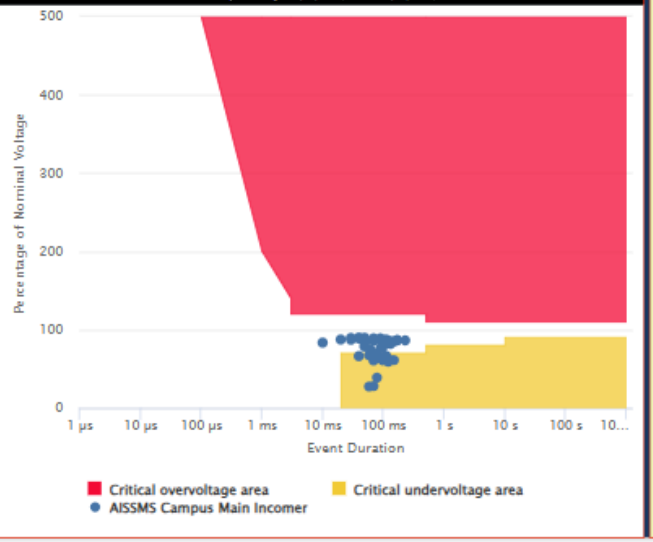
	Type	Phase	Start	Duration
E	Under voltage	L3	08/20/2025, 02:29:51...	230 ms
E	Under voltage	L2	08/20/2025, 02:29:51...	170 ms
E	Under voltage	L1	08/20/2025, 02:29:51...	170 ms
E	Under voltage	L3	08/14/2025, 05:43:21...	150 ms
E	Under voltage	L2	08/09/2025, 10:59:02...	150 ms
E	Under voltage	L2	08/14/2025, 05:43:21...	140 ms
E	Under voltage	L3	08/09/2025, 10:59:02...	130 ms
E	Under voltage	L1	08/14/2025, 05:43:21...	120 ms
E	Under voltage	L2	08/19/2025, 03:22:14...	120 ms
E	Under voltage	L3	08/19/2025, 03:22:14...	120 ms
E	Under voltage	L2	08/19/2025, 03:39:33...	110 ms
E	Under voltage	L3	08/20/2025, 05:01:40...	110 ms
E	Under voltage	L2	08/18/2025, 05:24:55...	100 ms
E	Under voltage	L2	08/19/2025, 01:27:19...	100 ms
E	Under voltage	L2	08/21/2025, 03:13:03...	100 ms

1507 entries total

15 1 2 3 4 5 ... 101

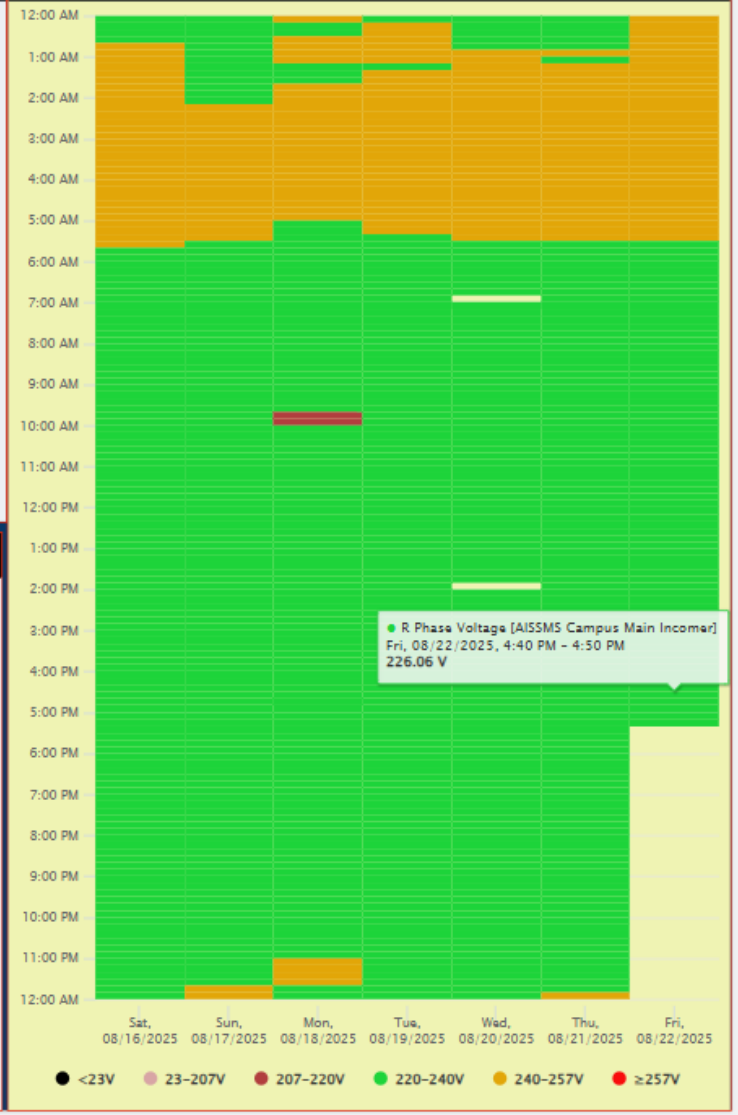
ITI(CBEMA) curve

Last 14 completed days: 09/08/2025, 00:00 - 23/08/2025, 00:00



Voltage

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00



sachin.shelar@aissmsioit.org

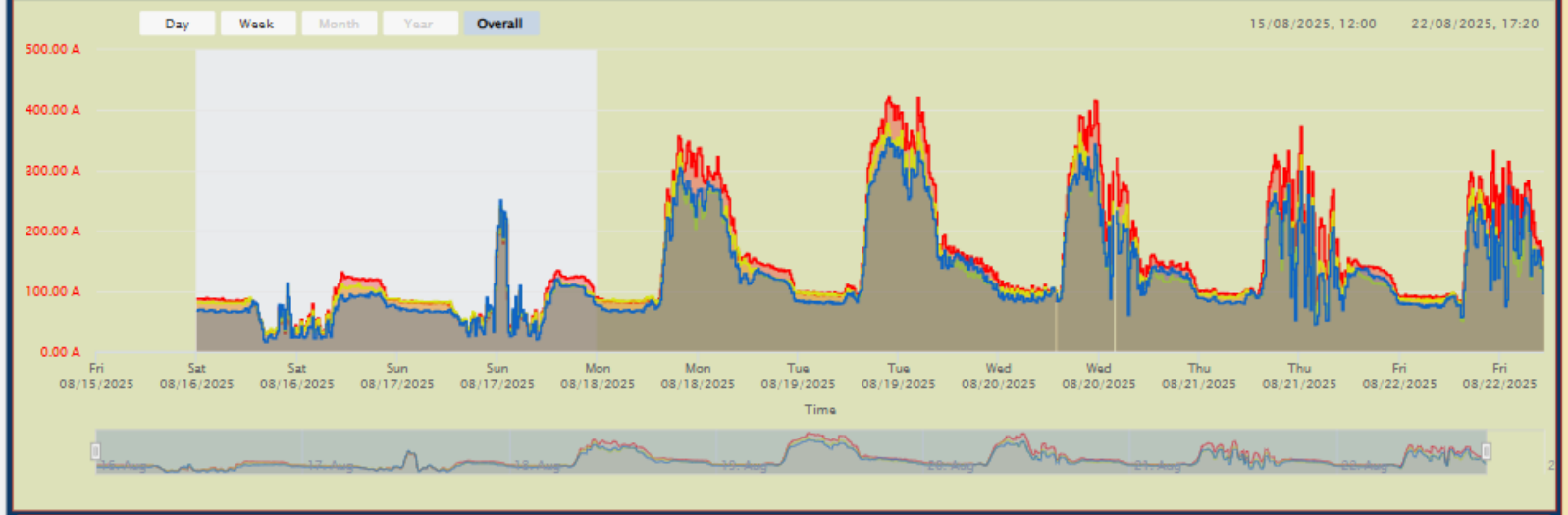
Historical

AISSMS PQ (Current) Dashboard

8/23/2025 8:49 AM

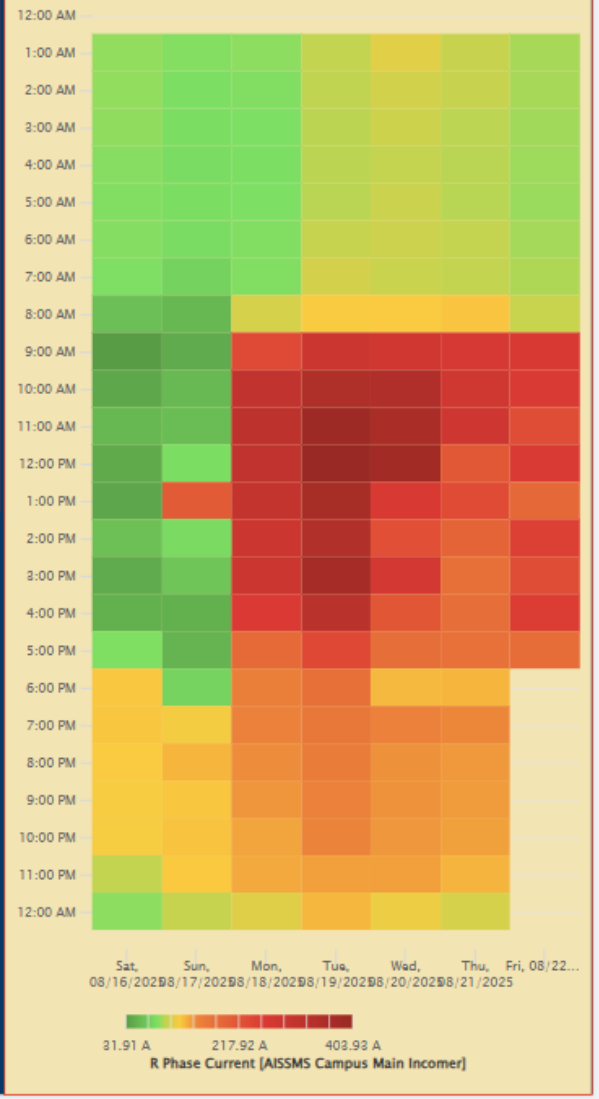
Current Profile

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00



Current Heat Map

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00



Current Summary

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00

Date	R Phase [AVG]	R Phase [MAX]	Y Phase [AVG]	Y Phase [MAX]	B Phase [AVG]	B Phase [MAX]	Neutral [AVG]	Neutral [MAX]
Sat, 08/16/2025	78 A	151 A	74 A	140 A	63 A	136 A	53 A	87 A
Sun, 08/17/2025	87 A	349 A	84 A	361 A	78 A	368 A	53 A	72 A
Mon, 08/18/2025	175 A	389 A	156 A	360 A	148 A	340 A	63 A	138 A
Tue, 08/19/2025	208 A	489 A	187 A	414 A	177 A	396 A	66 A	133 A
Wed, 08/20/2025	181 A	454 A	157 A	408 A	151 A	385 A	66 A	160 A
Thu, 08/21/2025	156 A	413 A	131 A	372 A	126 A	349 A	65 A	132 A
Fri, 08/22/2025	⚠ 168 A	⚠ 381 A	⚠ 140 A	⚠ 310 A	⚠ 137 A	⚠ 332 A	⚠ 66 A	⚠ 149 A

sachin.shelar@aissmsioit.org

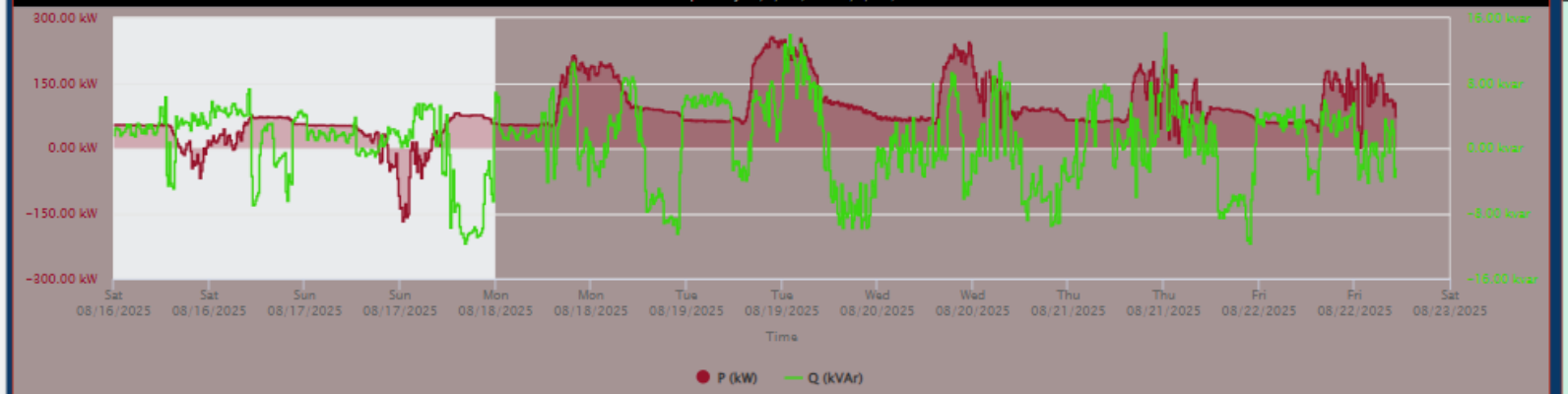
Historical

AISSMS Power Dashboard

8/23/2025 8:51 AM

Active Power & Reactive Power Variation

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00



Power Summary

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00

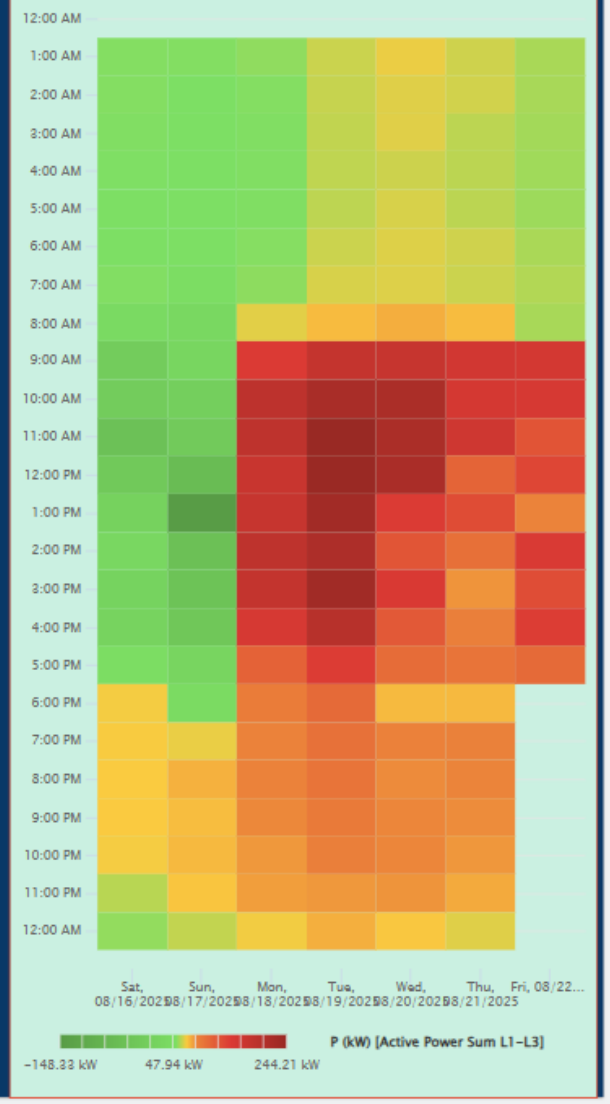
Date	P (kW) [MIN]	P (kW) [AVG]	P (kW) [MAX]	Q (kVAr) [MIN]	Q (kVAr) [MIN]	Q (kVAr) [MAX]	S (kVA) [MIN]	S (kVA) [AVG]	S (kVA) [MAX]
Sat, 08/16/2025	-82.63 kW	39.37 kW	87.32 kW	-21.97 kvar	-21.97 kvar	32.16 kvar	11.83 kVA	50.42 kVA	94.03 kVA
Sun, 08/17/2025	-249.44 kW	25.55 kW	104.23 kW	-20.28 kvar	-20.28 kvar	27.81 kvar	16.13 kVA	58.19 kVA	249.92 kVA
Mon, 08/18/2025	38.81 kW	107.24 kW	234.52 kW	-24.89 kvar	-24.89 kvar	23.30 kvar	40.92 kVA	109.51 kVA	235.89 kVA
Tue, 08/19/2025	54.23 kW	129.16 kW	284.81 kW	-32.04 kvar	-32.04 kvar	33.29 kvar	57.71 kVA	131.43 kVA	287.03 kVA
Wed, 08/20/2025	-11.70 kW	109.44 kW	268.76 kW	-30.48 kvar	-30.48 kvar	29.59 kvar	0.00 kVA	111.78 kVA	270.21 kVA
Thu, 08/21/2025	-65.19 kW	92.18 kW	250.91 kW	-17.69 kvar	-17.69 kvar	26.21 kvar	18.32 kVA	95.75 kVA	252.18 kVA
Fri, 08/22/2025	⚠ -77.57 kW	⚠ 98.59 kW	⚠ 234.05 kW	⚠ -26.60 kvar	⚠ -26.60 kvar	⚠ 31.59 kvar	⚠ 23.36 kVA	⚠ 102.33 kVA	⚠ 235.06 kVA

Distortion Power

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00

Heat Map

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00



sachin.shelar@aissmsioit.org

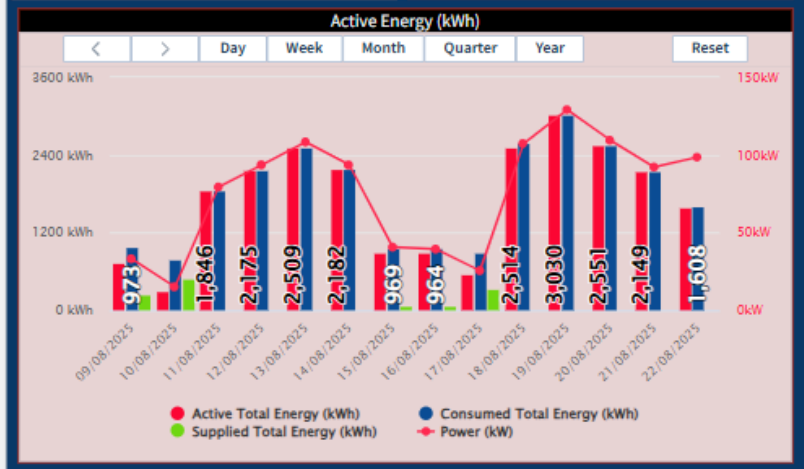
Historical

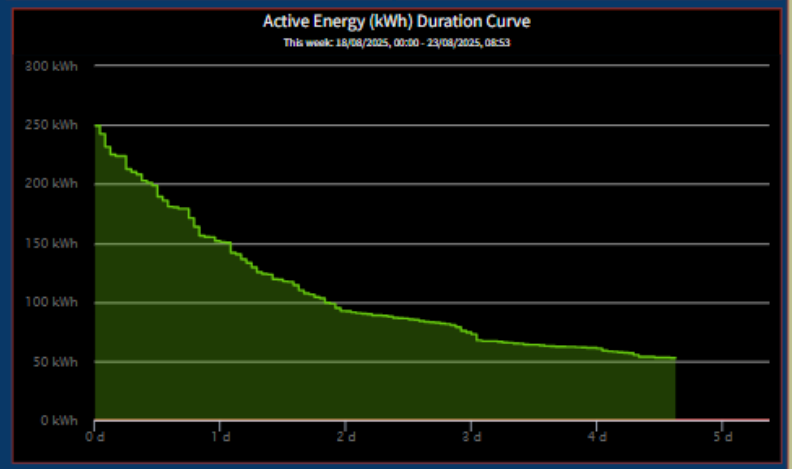
AISSMS Energy Dashboard

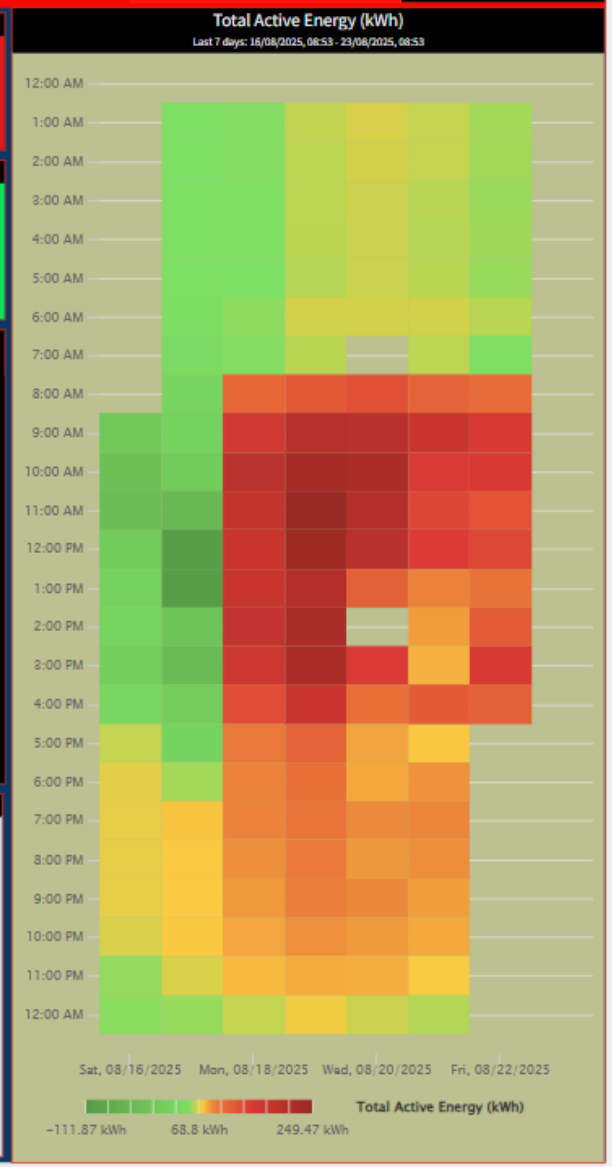
8/23/2025 8:55 AM

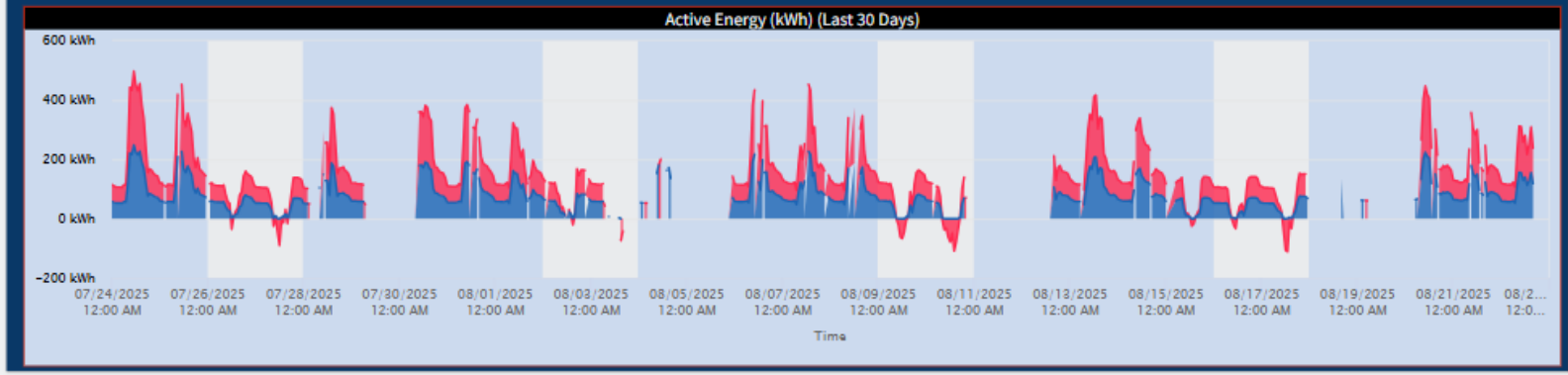
Yesterday - Active Energy	Last Week - Active Energy	Last Month - Active Energy	Last Year - Active Energy
1,597 kWh	11,413 kWh	58,546 kWh	252,257 kWh
Yesterday: 22/08/2025, 00:00 - 23/08/2025,			There are only about 42% of raw data in the

Today - Active Energy	This Week - Active Energy	This Month - Active Energy	This Year - Active Energy
19.86 kWh	12,104 kWh	40,456 kWh	418,951 kWh
No data available for the selected time range	There are only about 87% of raw data in the chosen time range.		









sachin.shelar@aissmsioit.org

Historical

AISSMS Consumption Analysis (Monthly)

AISSMS Campus Main Incomer 08/01/2025, 12:00 AM - 08/23/2025,

8/23/2025 8:56 AM

This Month Copy

Date	MSEDCL (Consumed)	Solar (Generated)	Solar (Supplied)	AISSMS (Total)
Tue, 07/01/2025	1,971 kWh	853 kWh	1 kWh	2,823 kWh
Wed, 07/02/2025	2,262 kWh	610 kWh	0 kWh	2,872 kWh
Thu, 07/03/2025	2,070 kWh	792 kWh	0 kWh	2,862 kWh
Fri, 07/04/2025	1,982 kWh	844 kWh	4 kWh	2,822 kWh
Sat, 07/05/2025	982 kWh	592 kWh	55 kWh	1,519 kWh
Sun, 07/06/2025	867 kWh	568 kWh	104 kWh	1,331 kWh
Mon, 07/07/2025	2,124 kWh	751 kWh	0 kWh	2,874 kWh
Tue, 07/08/2025	2,247 kWh	727 kWh	0 kWh	2,974 kWh
Wed, 07/09/2025	2,132 kWh	815 kWh	0 kWh	2,948 kWh
Thu, 07/10/2025	1,778 kWh	1,028 kWh	4 kWh	2,802 kWh
Fri, 07/11/2025	1,984 kWh	906 kWh	0 kWh	2,890 kWh
Sat, 07/12/2025	849 kWh	1,130 kWh	437 kWh	1,542 kWh
Sun, 07/13/2025	779 kWh	953 kWh	341 kWh	1,391 kWh
Mon, 07/14/2025	2,266 kWh	824 kWh	1 kWh	3,089 kWh
Tue, 07/15/2025	2,632 kWh	506 kWh	0 kWh	3,138 kWh
Wed, 07/16/2025	1,921 kWh	1,078 kWh	5 kWh	2,995 kWh
Thu, 07/17/2025	2,021 kWh	1,072 kWh	0 kWh	3,093 kWh
Fri, 07/18/2025	2,148 kWh	868 kWh	0 kWh	3,016 kWh
Sat, 07/19/2025	886 kWh	983 kWh	297 kWh	1,571 kWh
Sun, 07/20/2025	846 kWh	738 kWh	202 kWh	1,381 kWh
Mon, 07/21/2025	2,230 kWh	924 kWh	0 kWh	3,154 kWh
Tue, 07/22/2025	2,563 kWh	727 kWh	0 kWh	3,290 kWh
Wed, 07/23/2025	2,424 kWh	707 kWh	0 kWh	3,131 kWh
Thu, 07/24/2025	2,801 kWh	442 kWh	0 kWh	3,243 kWh
Fri, 07/25/2025	2,551 kWh	498 kWh	0 kWh	3,048 kWh
Sat, 07/26/2025	1,117 kWh	554 kWh	62 kWh	1,609 kWh
Sun, 07/27/2025	841 kWh	768 kWh	260 kWh	1,349 kWh
Mon, 07/28/2025	2,155 kWh	794 kWh	5 kWh	2,945 kWh
Tue, 07/29/2025	2,190 kWh	841 kWh	0 kWh	3,031 kWh
Wed, 07/30/2025	2,533 kWh	511 kWh	0 kWh	3,044 kWh
Thu, 07/31/2025	2,450 kWh	587 kWh	0 kWh	3,037 kWh
Total	58,600 kWh	23,991 kWh	1,781 kWh	80,811 kWh

This Month

Date	MSEDCL (Consumed)	Solar (Generated)	Solar (Supplied)	AISSMS (Total)
Fri, 08/01/2025	2,021 kWh	928 kWh	0 kWh	2,948 kWh
Sat, 08/02/2025	1,116 kWh	872 kWh	139 kWh	1,849 kWh
Sun, 08/03/2025	955 kWh	1,078 kWh	357 kWh	1,676 kWh
Mon, 08/04/2025	2,383 kWh	839 kWh	0 kWh	3,221 kWh
Tue, 08/05/2025	2,135 kWh	1,119 kWh	0 kWh	3,254 kWh
Wed, 08/06/2025	2,401 kWh	606 kWh	0 kWh	3,007 kWh
Thu, 08/07/2025	2,363 kWh	910 kWh	0 kWh	3,273 kWh
Fri, 08/08/2025	2,350 kWh	541 kWh	0 kWh	2,891 kWh
Sat, 08/09/2025	973 kWh	802 kWh	238 kWh	1,537 kWh
Sun, 08/10/2025	794 kWh	1,032 kWh	493 kWh	1,334 kWh
Mon, 08/11/2025	1,846 kWh	1,359 kWh	0 kWh	3,205 kWh
Tue, 08/12/2025	2,175 kWh	1,049 kWh	0 kWh	3,223 kWh
Wed, 08/13/2025	2,509 kWh	631 kWh	0 kWh	3,139 kWh
Thu, 08/14/2025	2,184 kWh	773 kWh	2 kWh	2,955 kWh
Fri, 08/15/2025	⚠ 969 kWh	582 kWh	⚠ 78 kWh	1,473 kWh
Sat, 08/16/2025	964 kWh	609 kWh	73 kWh	1,500 kWh
Sun, 08/17/2025	897 kWh	872 kWh	340 kWh	1,430 kWh
Mon, 08/18/2025	2,593 kWh	434 kWh	0 kWh	3,028 kWh
Tue, 08/19/2025	3,030 kWh	248 kWh	0 kWh	3,278 kWh
Wed, 08/20/2025	2,551 kWh	530 kWh	0 kWh	3,081 kWh
Thu, 08/21/2025	2,153 kWh	898 kWh	4 kWh	3,047 kWh
Fri, 08/22/2025	⚠ 1,608 kWh	⚠ 734 kWh	⚠ 11 kWh	2,331 kWh
Sat, 08/23/2025	-	-	-	0 kWh
Total	⚠ **40,971 kWh**	⚠ **17,446 kWh**	⚠ **1,735 kWh**	56,682 kWh

Today
No data available for

Yesterday
1,608 kWh

This Week
12,199 kWh

Last Week
11,906 kWh

This Month
42,271 kWh

Last Month
60,326 kWh

This Year
443,768 kWh

Last Year
372,630 kWh

sachin.shelar@aissmsioit.org

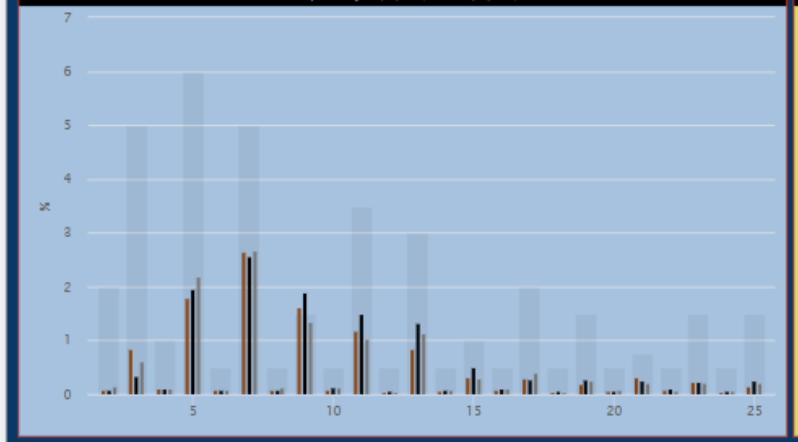
Historical

AISSMS PQ (Harmonics) (Last 7 Days) Dashboard

8/23/2025 8:57 AM

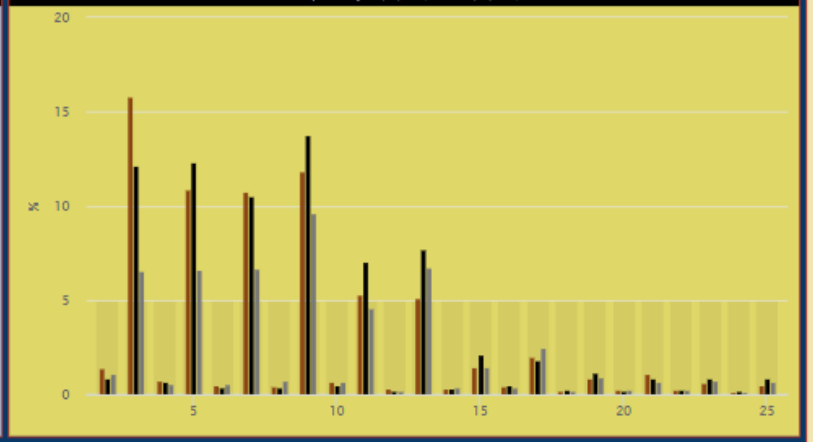
Voltage Harmonics - THD (%)

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00



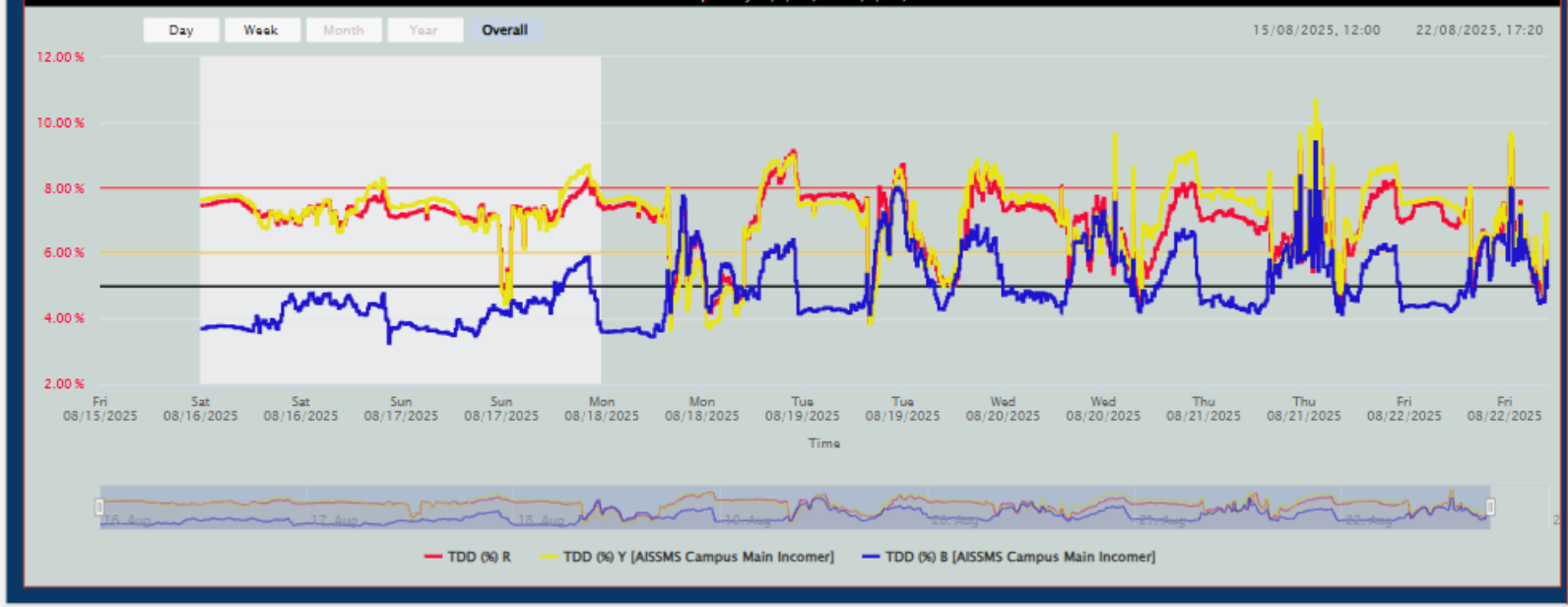
Current Harmonics - THD (%)

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00



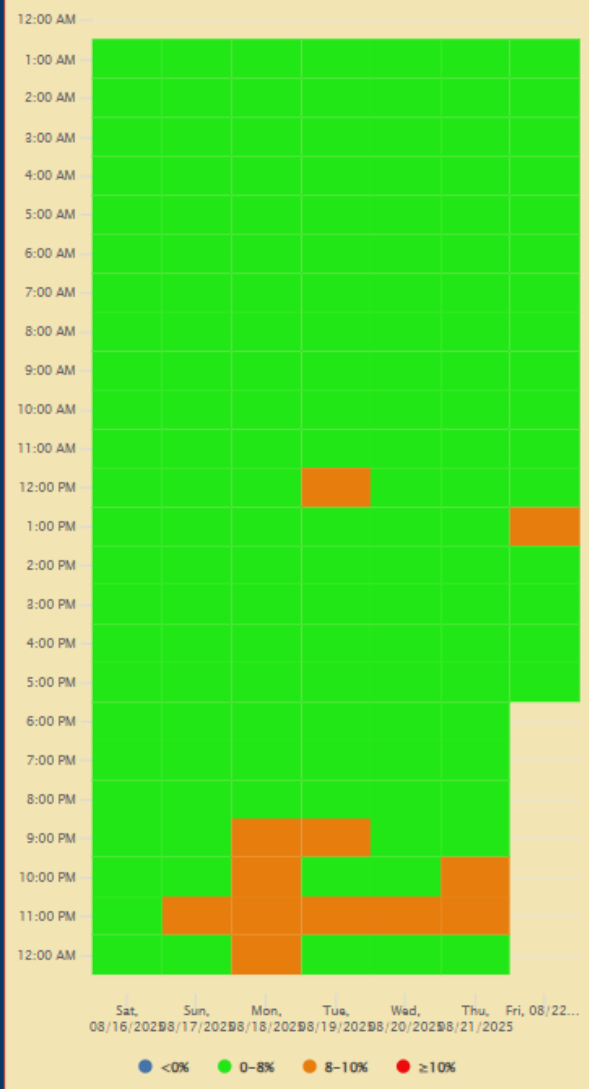
TDD (%)

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00



Harmonics TDD(%) R Phase - Heat Map

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00

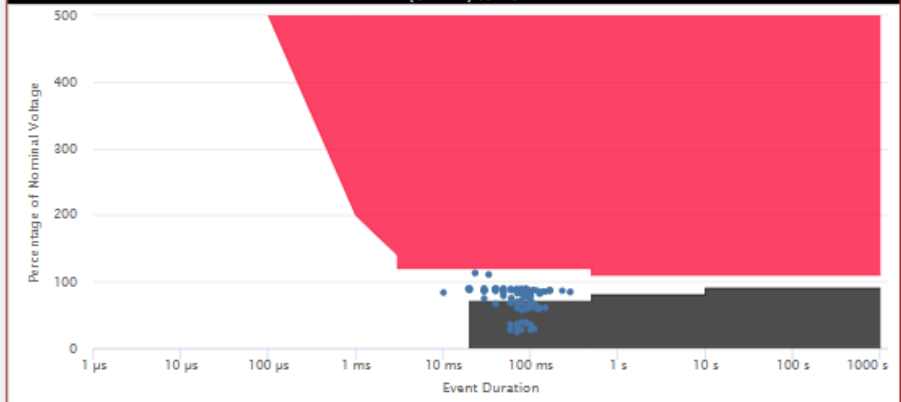


sachin.shelar@aissmsioit.org

Historical

AISSMS Overall PQ Health (Last 30 Days) Dashboard 8/23/2025 9:01 AM

ITI(CBEMA) curve



Distortion Power

This year: 01/01/2025, 00:00 - 23/08/2025, 08:58

Date	R Phase [AVG]	Y Phase [AVG]	B Phase [AVG]
January	4.03 kvar	3.91 kvar	3.88 kvar
February	3.87 kvar	3.81 kvar	3.85 kvar
March	4.36 kvar	4.29 kvar	4.18 kvar
April	5.63 kvar	5.48 kvar	4.89 kvar
May	6.61 kvar	5.81 kvar	4.86 kvar
June	6.75 kvar	6.66 kvar	4.82 kvar
July	6.35 kvar	6.45 kvar	4.62 kvar
August	6.76 kvar	6.70 kvar	4.76 kvar

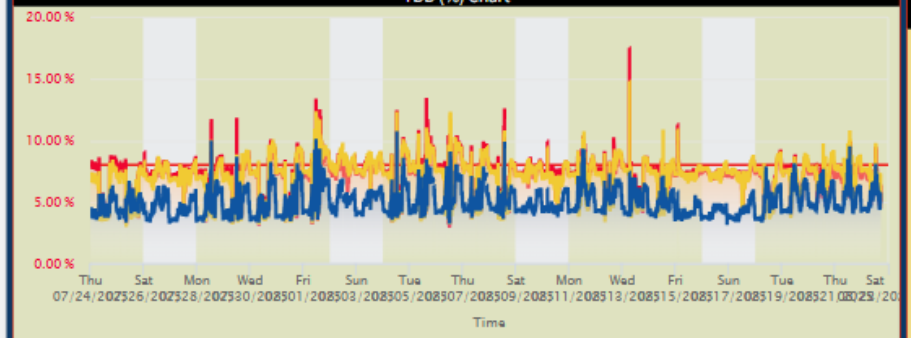
Event List

Last 30 completed days: 24/07/2025, 00:00 - 23/08/2025, 00:00

Type	Phase	Start	Duration	Value
Under voltage	L3	07/27/2025, 06:32:20...	290 ms	194.4 (MIN)
Under voltage	L3	08/20/2025, 02:29:51...	230 ms	198.7 (MIN)
Under voltage	L2	08/20/2025, 02:29:51...	170 ms	198.7 (MIN)
Under voltage	L1	08/20/2025, 02:29:51...	170 ms	200.3 (MIN)
Under voltage	L3	08/14/2025, 05:43:21...	150 ms	195.5 (MIN)
Under voltage	L2	08/09/2025, 10:59:02...	150 ms	140.5 (MIN)
Under voltage	L2	08/14/2025, 05:43:21...	140 ms	195.6 (MIN)
Under voltage	L3	08/09/2025, 10:59:02...	130 ms	188.3 (MIN)
Under voltage	L3	07/30/2025, 11:26:08...	130 ms	136.4 (MIN)
Under voltage	L1	08/14/2025, 05:43:21...	120 ms	198.4 (MIN)
Under voltage	L2	08/19/2025, 03:22:14...	120 ms	144.5 (MIN)
Under voltage	L3	08/19/2025, 03:22:14...	120 ms	135.7 (MIN)
Under voltage	L2	08/19/2025, 03:39:33...	110 ms	201.2 (MIN)
Under voltage	L2	08/03/2025, 12:59:53...	110 ms	66.9 (MIN)
Under voltage	L3	08/20/2025, 05:01:40...	110 ms	153.1 (MIN)
Under voltage	L2	08/18/2025, 05:24:55...	100 ms	197.8 (MIN)
Under voltage	L1	08/03/2025, 12:59:53...	100 ms	64.3 (MIN)
Under voltage	L3	08/03/2025, 12:59:53...	100 ms	62.3 (MIN)
Under voltage	L1	08/02/2025, 04:53:30...	100 ms	161.3 (MIN)
Under voltage	L1	07/25/2025, 12:57:20...	100 ms	182.1 (MIN)
Under voltage	L2	08/19/2025, 01:27:19...	100 ms	147.7 (MIN)
Under voltage	L1	07/26/2025, 09:41:07...	100 ms	144.9 (MIN)
Under voltage	L2	08/21/2025, 03:13:03...	100 ms	191.4 (MIN)
Under voltage	L3	08/19/2025, 01:27:19...	100 ms	140 (MIN)
Under voltage	L1	08/08/2025, 08:24:54...	100 ms	81 (MIN)
Under voltage	L2	07/30/2025, 11:26:09...	100 ms	197.5 (MIN)
Under voltage	L2	08/09/2025, 12:26:38...	100 ms	177 (MIN)
Under voltage	L1	08/09/2025, 12:26:38...	100 ms	187.1 (MIN)
Under voltage	L1	08/17/2025, 07:16:34...	91 ms	205.3 (MIN)
Under voltage	L3	07/30/2025, 04:26:23...	90 ms	203.3 (MIN)

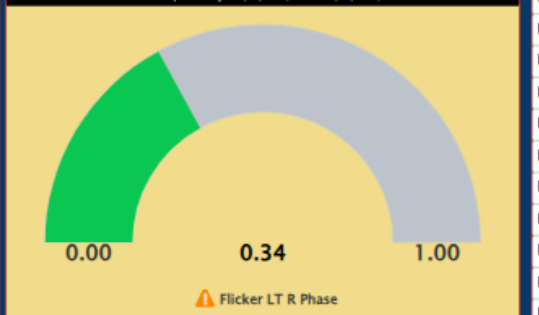
91 entries total 30 1 2 3 4

TDD (%) Chart

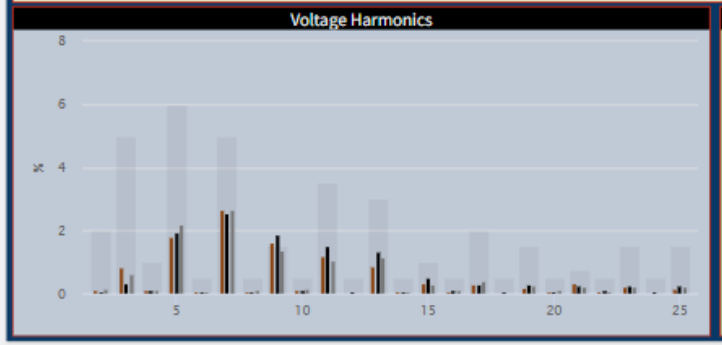


Long Term Flicker

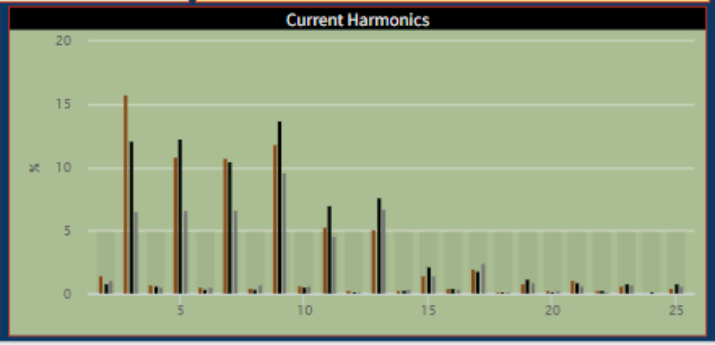
Last 30 completed days: 24/07/2025, 00:00 - 23/08/2025, 00:00



Voltage Harmonics



Current Harmonics



sachin.shelar@aissmsioit.org

Historical

PQ Events - ITIC (Last 14 Days) Dashboard

8/23/2025 8:58 AM

Power Quality Event List

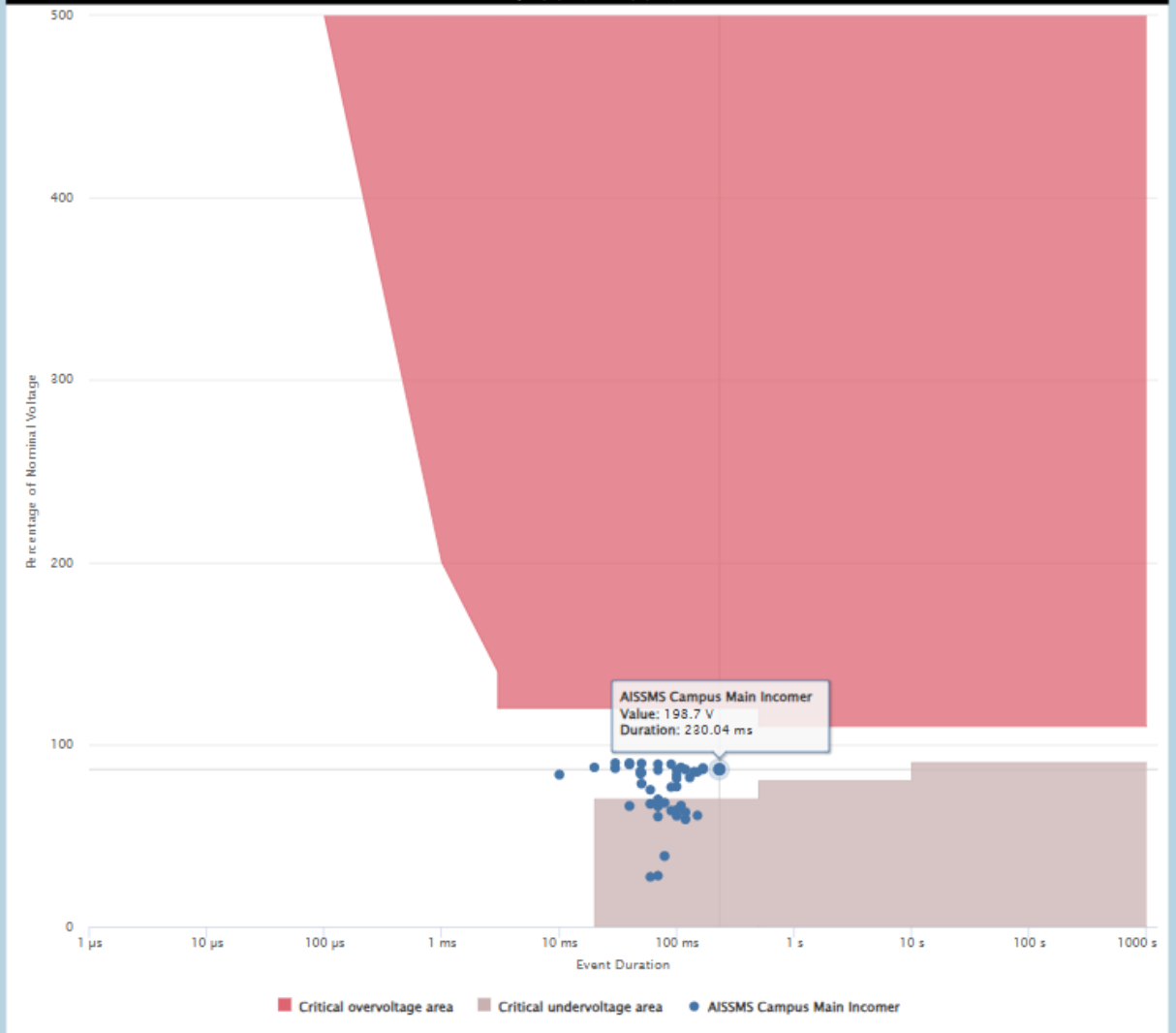
Last 14 days: 09/08/2025, 08:57 - 23/08/2025, 08:57

	Type	Phase	Start	Duration	Value
E	Under voltage	L3	08/20/2025, 02...	230 ms	198.7 (MIN)
E	Under voltage	L2	08/20/2025, 02...	170 ms	198.7 (MIN)
E	Under voltage	L1	08/20/2025, 02...	170 ms	200.3 (MIN)
E	Under voltage	L3	08/14/2025, 05...	150 ms	195.5 (MIN)
E	Under voltage	L2	08/09/2025, 10...	150 ms	140.5 (MIN)
E	Under voltage	L2	08/14/2025, 05...	140 ms	195.6 (MIN)
E	Under voltage	L3	08/09/2025, 10...	130 ms	188.3 (MIN)
E	Under voltage	L1	08/14/2025, 05...	120 ms	198.4 (MIN)
E	Under voltage	L2	08/19/2025, 03...	120 ms	144.5 (MIN)
E	Under voltage	L3	08/19/2025, 03...	120 ms	135.7 (MIN)
E	Under voltage	L2	08/19/2025, 03...	110 ms	201.2 (MIN)
E	Under voltage	L3	08/20/2025, 05...	110 ms	153.1 (MIN)
E	Under voltage	L2	08/18/2025, 05...	100 ms	197.8 (MIN)
E	Under voltage	L2	08/19/2025, 01...	100 ms	147.7 (MIN)
E	Under voltage	L2	08/21/2025, 03...	100 ms	191.4 (MIN)
E	Under voltage	L3	08/19/2025, 01...	100 ms	140 (MIN)
E	Under voltage	L2	08/09/2025, 12...	100 ms	177 (MIN)
E	Under voltage	L1	08/09/2025, 12...	100 ms	187.1 (MIN)
E	Under voltage	L1	08/17/2025, 07...	91 ms	205.3 (MIN)
E	Under voltage	L1	08/19/2025, 01...	90 ms	146.6 (MIN)
E	Under voltage	L2	08/17/2025, 03...	90 ms	176.2 (MIN)
E	Under voltage	L1	08/19/2025, 09...	80 ms	89.2 (MIN)
E	Under voltage	L2	08/18/2025, 03...	80 ms	156.4 (MIN)
E	Under voltage	L3	08/18/2025, 04...	70 ms	151.8 (MIN)
E	Under voltage	L3	08/19/2025, 09...	70 ms	64.4 (MIN)
E	Under voltage	L1	08/19/2025, 03...	70 ms	139.2 (MIN)
E	Under voltage	L2	08/09/2025, 12...	70 ms	197.9 (MIN)
E	Under voltage	L2	08/09/2025, 12...	70 ms	205.3 (MIN)
E	Under voltage	L1	08/20/2025, 05...	70 ms	158.2 (MIN)

45 entries total 60 1

ITI(CBEMA) - AISSMS Main Incomer

Last 14 days: 09/08/2025, 08:57 - 23/08/2025, 08:57

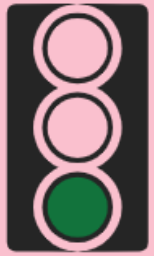


sachin.shelar@aissmsioit.org

Maharashtra PQ Regulation 2021 Compliance AISSMS

08/16/2025, 12:00 AM - 08/23/2025, 12:00 AM

V-RY [10 min Avg] (352.75 to 456.5 Volts)

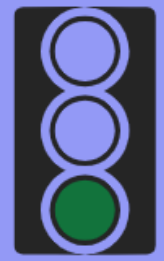


V R-Y [10-minute average]

V-YB [10 min Avg] (352.75 to 456.5 Volts)

V Y-B [10-minute average]

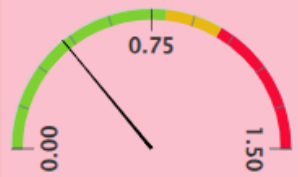
V-BR [10 min Avg] (352.75 to 456.5 Volts)



V R-B [10-minute average]

R-Ph Plt (< 1)

0.42

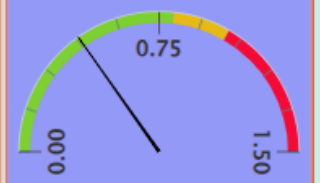


Y-Ph Plt (< 1)

0.49

B-Ph Plt (< 1)

0.46



SUpply Voltage Unbalance (< 2%)

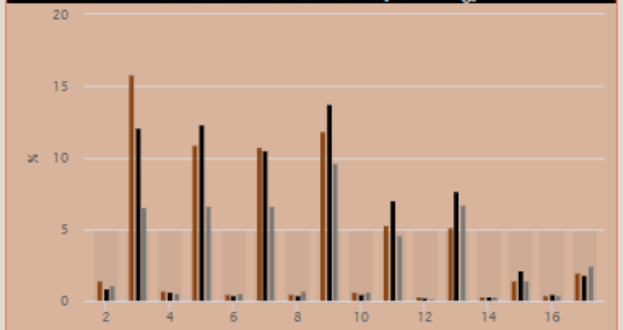
0.56 %

Clause 22.5. - Supply Voltage Variation Compliance (Last Week)

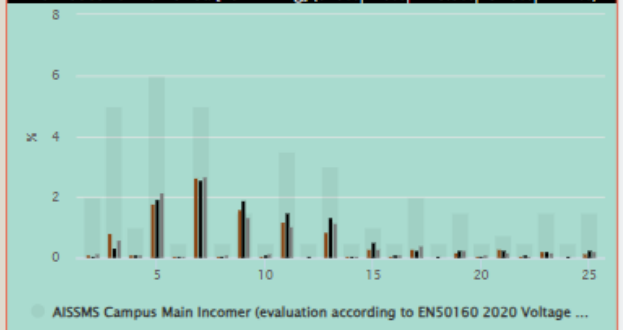
Mean r.m.s. value of the supply voltage over 10 minutes (352.75 to 456.5 Volts)

Overall: Pass

Individual Harmonic Current % [10 min Avg]



Individual Harmonic Vol. [10 min Avg] (5<5%|7<6%|11<3.5%|13<3%|17<2%)



Supply Voltage Dips [1 Year <=280]

4%

Voltage Sags: 10/280 (4%)

Short Voltage Interruptions [1 Year <=75]

Last 7 completed days: 16/08/2025, 00:00 - 23/08/2025, 00:00

No data available for the selected time range

Error fetching event count.

Current Harmonic [10 min Avg] (100% <= 8%)

Date	R - TDD (%) [AVG]	Y - TDD (%) [AVG]	B - TDD (%) [AVG]
CW 33 2025	7.27 %	7.36 %	4.21 %
CW 34 2025	6.86 %	7.05 %	5.27 %

Supply Voltage Harmonic [10 min Avg] (100% <= 8%)

Date	R THD(%) [AVG]	Y THD(%) [AVG]	B THD(%) [AVG]
CW 33 2025	1.78 %	1.97 %	1.92 %
CW 34 2025	1.81 %	1.94 %	1.90 %

Clause 22.13 - TDD Compliance

As per IEEE 519-2014 (<8%)

Overall: Pass

Clause 22.11 - Voltage THD Compliance

As per IS 17036 (<8%)

Overall: Pass

sachin.shelar@aissmsioit.org

Enhanced Power Quality Report - IEEE 519 -2022

IEEE 519 Compliance

Customer

Name:	AISSMS
Company:	AISSMS RTO Campus Pune
Location:	Main Incomer (3 Phase) LT Side

Auditor

Name:	Prof. Sachin Shelar
Company:	Power Quality Cell (AISSMS IOIT Pune)

Start date: 18/08/2025, 00:00
End date: 24/08/2025, 23:59
Date: 31/08/2025, 14:48
Software: Janitza-GridVis 9.2.4(206)

Measurement Point: **AISSMS Campus Main Incomer**
Serial Number: 4201-2781
Device type: UMG 512
Flicker: Supported
Events: Supported
Transients: Supported

Configuration

ISC/IL ratio: 20 < ratio <= 50 (1 to 2 large customers)
Value: Current
Timebase: Short Time (10 min)
Percentile: 99th percentile

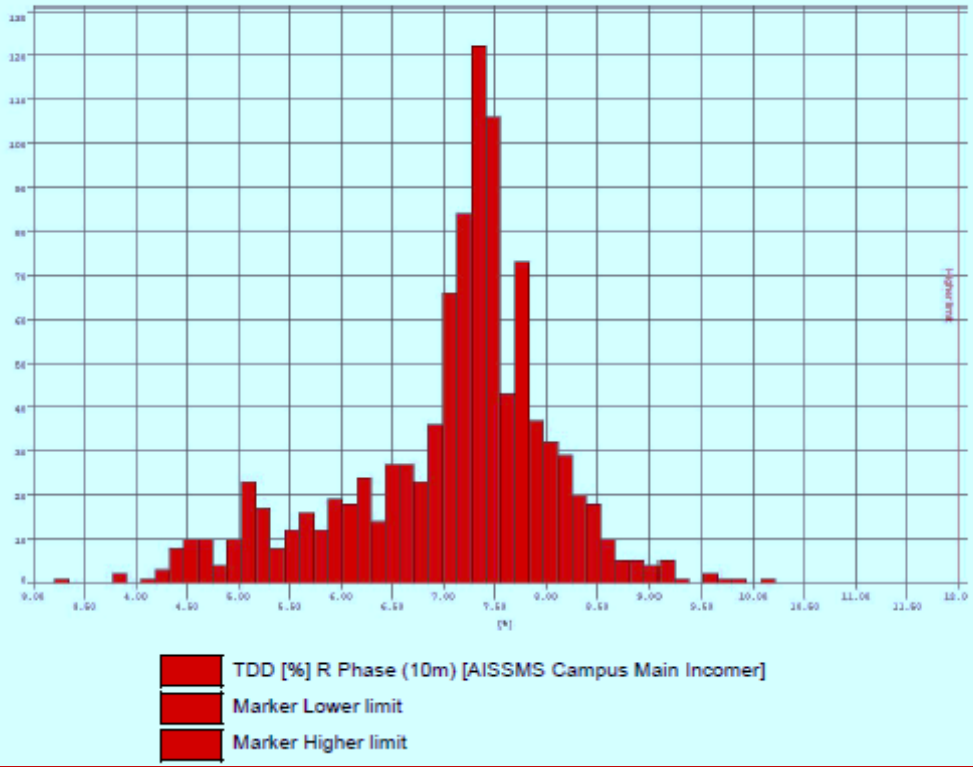
	Minimum	Maximum	Result	recording gap
TDD [%] R Phase	3.21 %	10.07 %	Passed	2.03%
TDD [%] Y Phase	3.68 %	11.28 %	Passed	2.03%
TDD [%] B Phase	2.96 %	9.40 %	Passed	2.03%

Limits

Lower limit	0.00
Higher limit	12.00
Percentage	99.00%

Results

Min value	3.21 %
Average value	7.07 %
Max value	10.07 %
Total Values	990
Total out	0 (0.00%)
Overcut	0 (0.00%)
Undercut	0 (0.00%)
Recording vacancy	2.03%
Result	Passed



sachin.shelar@aissmsioit.org

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Thank You !

sachin.shelar@aissmsioit.org