INTRODUCTION TO THYTRON SOLAR TREK MONITORING SYSTEM

TABLE OF CONTENTS

B	ALS	**ALS**	5th Oct 2024
Rev	**Prepared**	**Checked**	**Date**

THYTRON POWER PRODUCTS SDN BHD
31, Jalan Taming 10, Kawasan Perindustrian Taming Jaya, 43300 Balakong, Selangor D.E
Tel:+603-89619005 / +603-89626353 | Fax: 03-89621429 | www.thytron.com

1. Introduction to Thytron Solar Trek Monitoring System

Welcome to Introduction to Thytron Solar Trek Monitoring System, the cutting-edge HMI solution designed to revolutionize Solar hybrid monitoring. In an era where sustainable energy solutions are paramount, our intuitive interface empowers users to effortlessly oversee and optimize solar hybrid systems with precision and ease.

2. Features and Benefits:

i. Real-Time Monitoring: Gain instant insights into system performance, energy production, and consumption with live data visualization.
   - Benefit: Users can make informed decisions quickly, ensuring optimal system performance and maximizing energy production.

ii. Customizable Dashboards: Tailor the interface to suit your preferences, displaying only the metrics that matter most to you.
   - Benefit: Users can make informed decisions quickly, ensuring optimal system performance and maximizing energy production.

iii. Alerts and Notifications: Stay informed about system anomalies or performance fluctuations, facilitating timely intervention to maintain optimal operation.
   - Benefit: Users can make informed decisions quickly, ensuring optimal system performance and maximizing energy production.

iv. Historical Data Analysis: Access and analyze historical data trends to identify patterns, anomalies, and opportunities for efficiency improvements over time.
   - Benefit: Users can identify trends and areas for improvement, leading to enhanced system efficiency and cost savings over time.

v. Integration Capabilities: Seamlessly integrate with other software and hardware systems, such as SCADA, PLCs, or DCS, to create a unified monitoring and control ecosystem.
   - Benefit: Users can identify trends and areas for improvement, leading to enhanced system efficiency and cost savings over time.

vi. User Access Control: Manage user permissions and access levels to ensure data security and compliance with regulatory requirements, granting specific privileges to different users or user groups.
   - Benefit: Users can identify trends and areas for improvement, leading to enhanced system efficiency and cost savings over time.

vii. Remote Troubleshooting: Diagnose and troubleshoot system issues remotely, reducing downtime and minimizing the need for on-site maintenance visits.
- Benefit: Users can identify trends and areas for improvement, leading to enhanced system efficiency and cost savings over time.

viii. Energy Forecasting: Generate accurate forecasts for future energy production and consumption based on historical data and weather forecasts, allowing for better planning and optimization of energy resources.
- Benefit: Users can plan and optimize energy resources effectively, improving operational efficiency and reducing costs.

ix. Reporting: Generate reports and analytics summaries to track key performance indicators, trends, facilitating data-driven decision-making and performance evaluation.
- Benefit: Users can make data-driven decisions confidently and optimize system performance.

x. User-friendly Interface: Provide an intuitive and user-friendly interface with easy navigation, interactive visualization tools, and contextual help features to enhance user experience and productivity.
- Benefit: Users can navigate the system effortlessly, reducing the learning curve and allowing them to quickly access the information they need.

3. Technical Specifications:

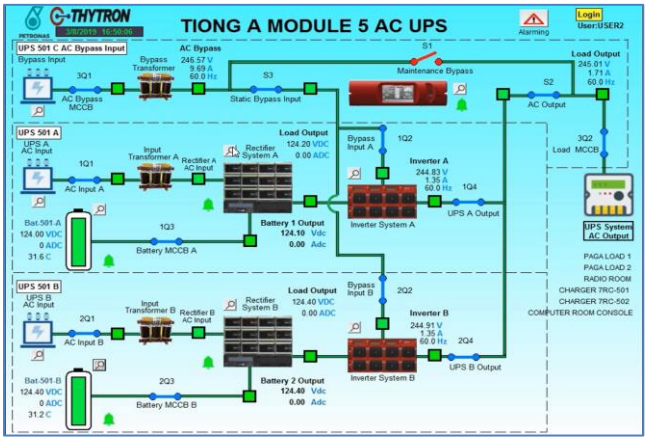
Processor: Intel® CoreTM i7-8665UE/i5-8365UE/i3-8145UE or Celeron® 4305UE (TDP up to 15W).
Memory: 500GB SSD with 8GB RAM.
Ports: 2 x RS-232/422/485, 2 x RS-232, 3 x 10/100/1000 Mbps Ethernet (1 x Intel® i219-LM, 2 x Intel® i210-IT), 2 x USB 3.1 Gen2, 2 x USB 3.1 Gen1 and 2 x USB 2.0.
Power Supply: 9 to 36 VDC.
Enclosure: IP65-rated compliant front bezel.

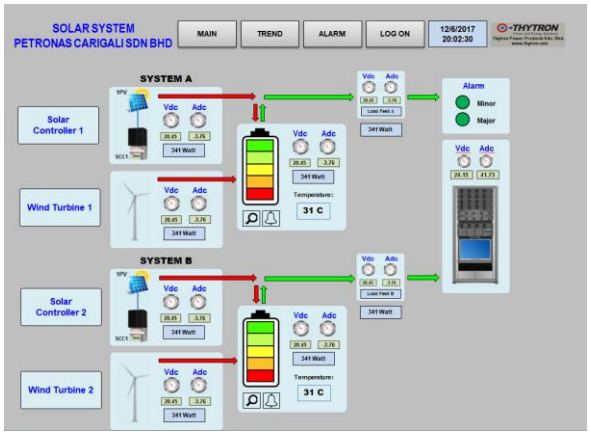
Software Specifications:

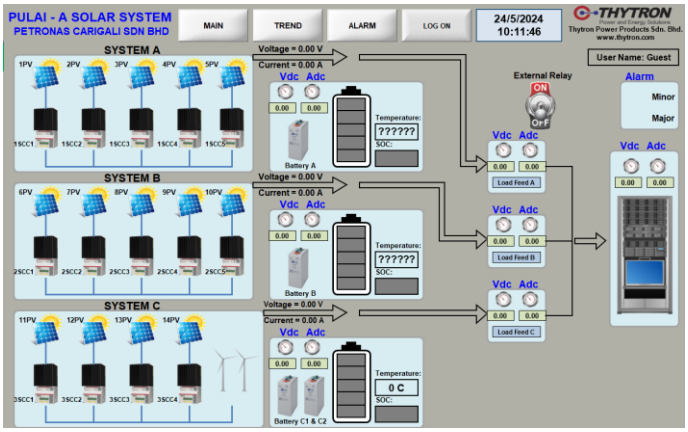
Operating System: Windows 10 Pro
HMI Software: AVEVA EDGE 2020
Communication Protocols: TCP/IP, RS232 and RS 485
Supported Protocols: Modbus TCP/IP, Modbus RTU, OPC-UA etc.
Networking: Ethernet
I/O Modules: ICP CON Analog Input, Digital Input and Digital Output.

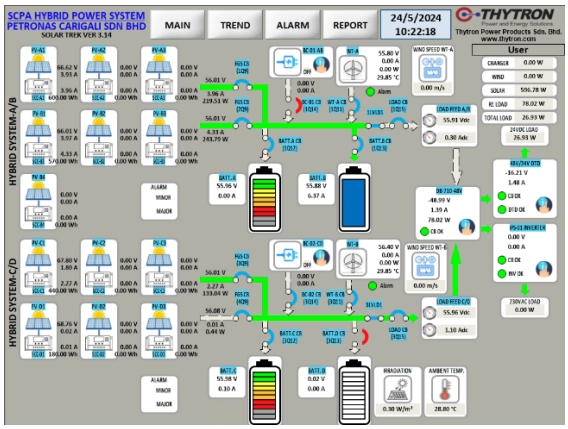
4. Thytron Solar Trek HMI Software

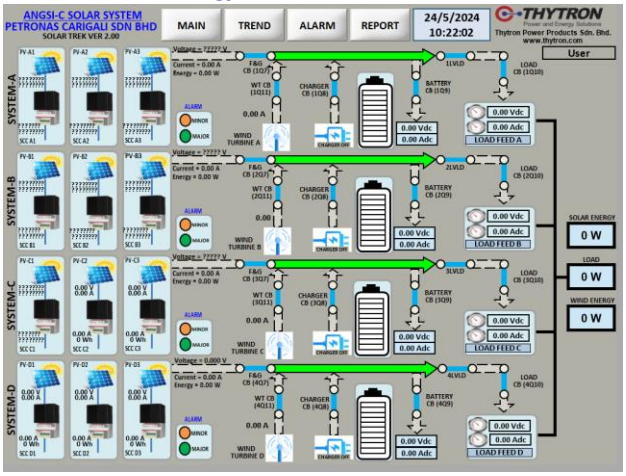
The Solar Trek Monitoring System is a comprehensive solution designed to efficiently monitor and manage solar power systems. With its user-friendly interface and robust functionality, Solar Trek empowers users to remotely monitor live operations, optimize production, improve efficiency, and extend the lifespan of solar energy systems. This system provides real-time data display, customizable data trending, alarm notifications, external control capabilities, and seamless integration with diverse networking environments, ensuring reliable and effective performance.











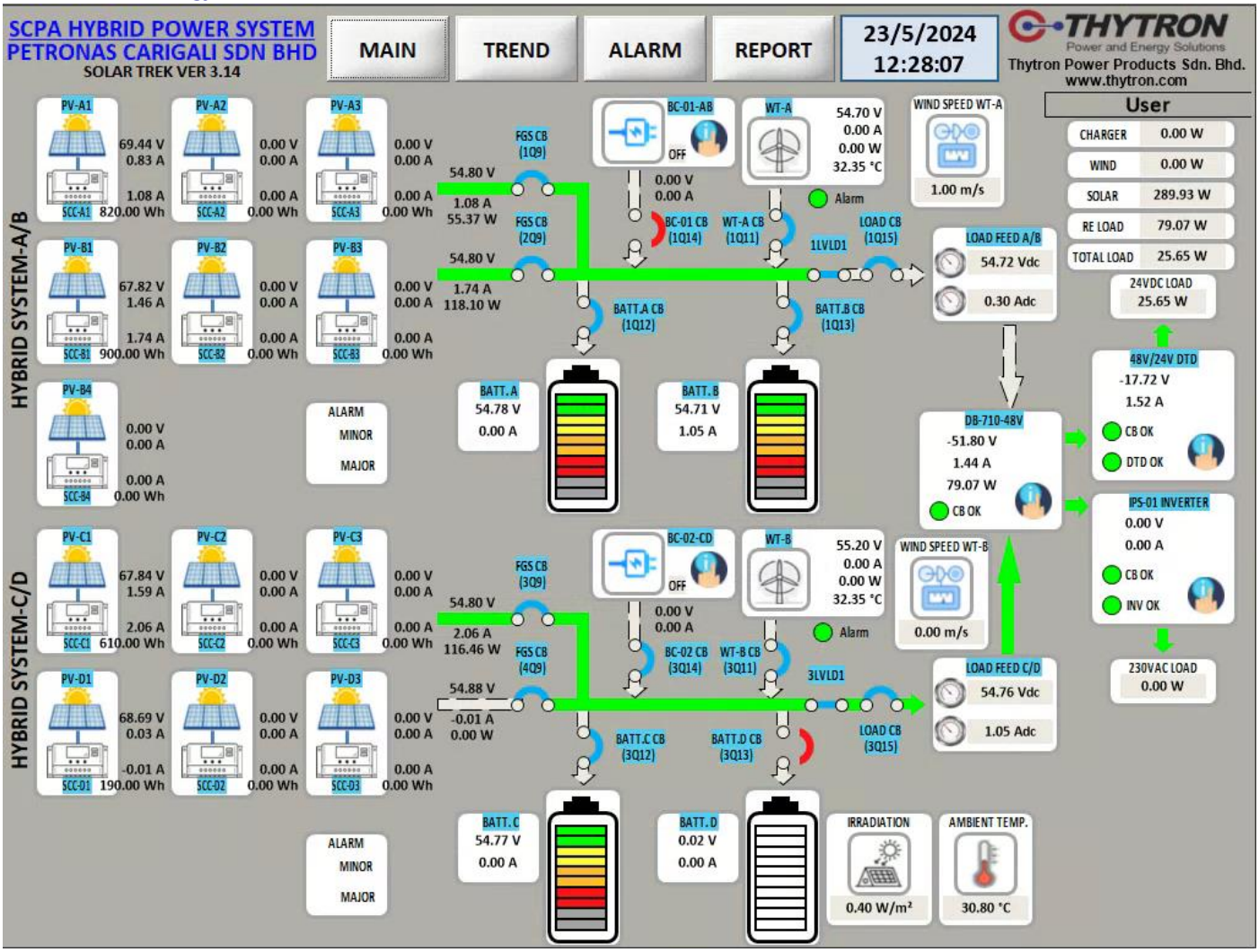
Software Consisted of:

A. Customization software for real time remote monitoring remote site via internet
B. System information can be safely archived for up to 2 years.
C. Parameters and stored data will help you analyze events and system status, keeping your system's health and performance at the highest level.
D. System Trending with Battery Voltage, Battery Current, System Voltage, System Current, Load voltage, load current, Energy Consumption with History Record.
E. Data logging and Alarm notification.
F. Optional Customization Remote control with digital output control port.

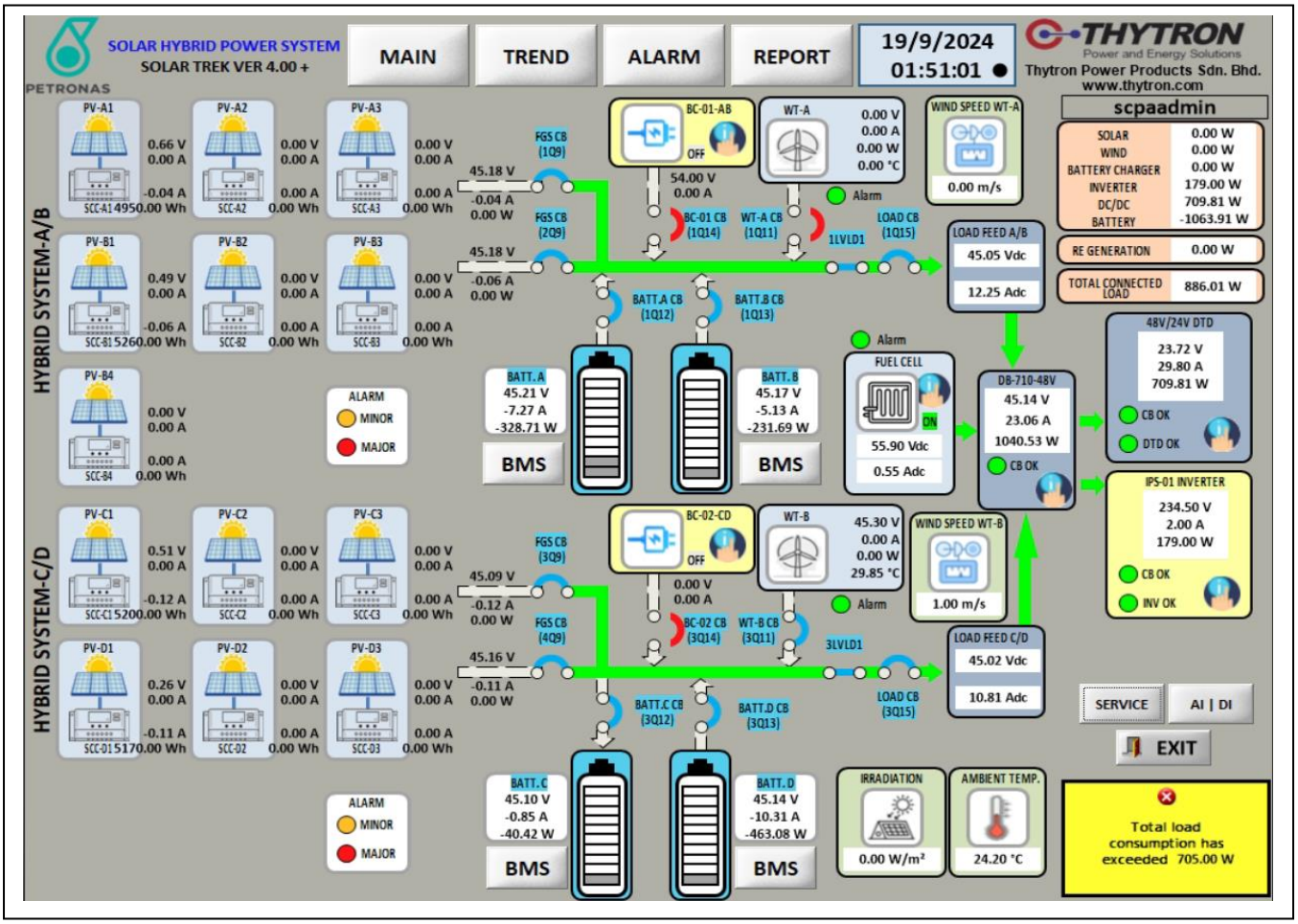
Example Of Our HMI SCREEN:

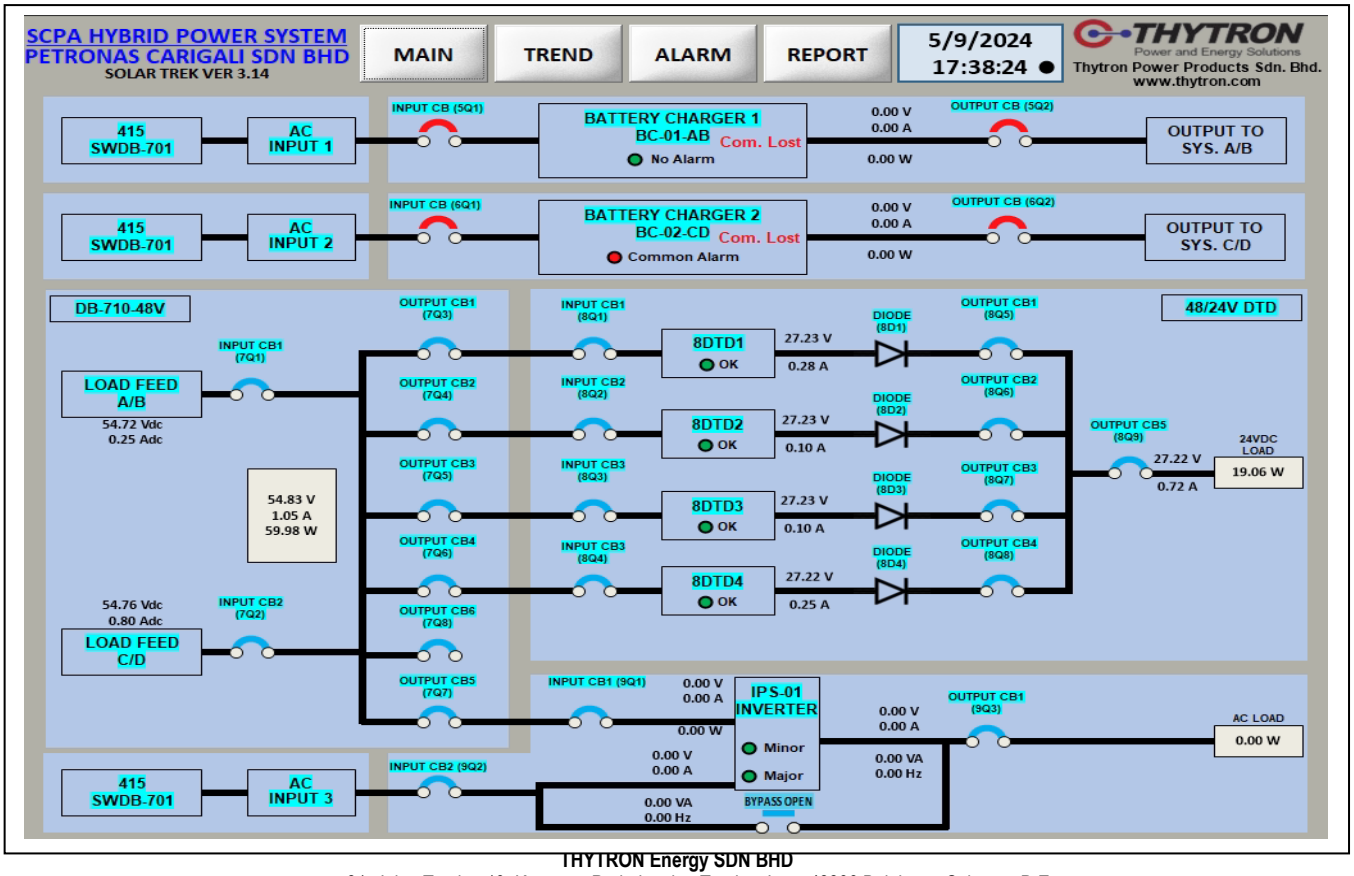
Main Screen View and Live View Information

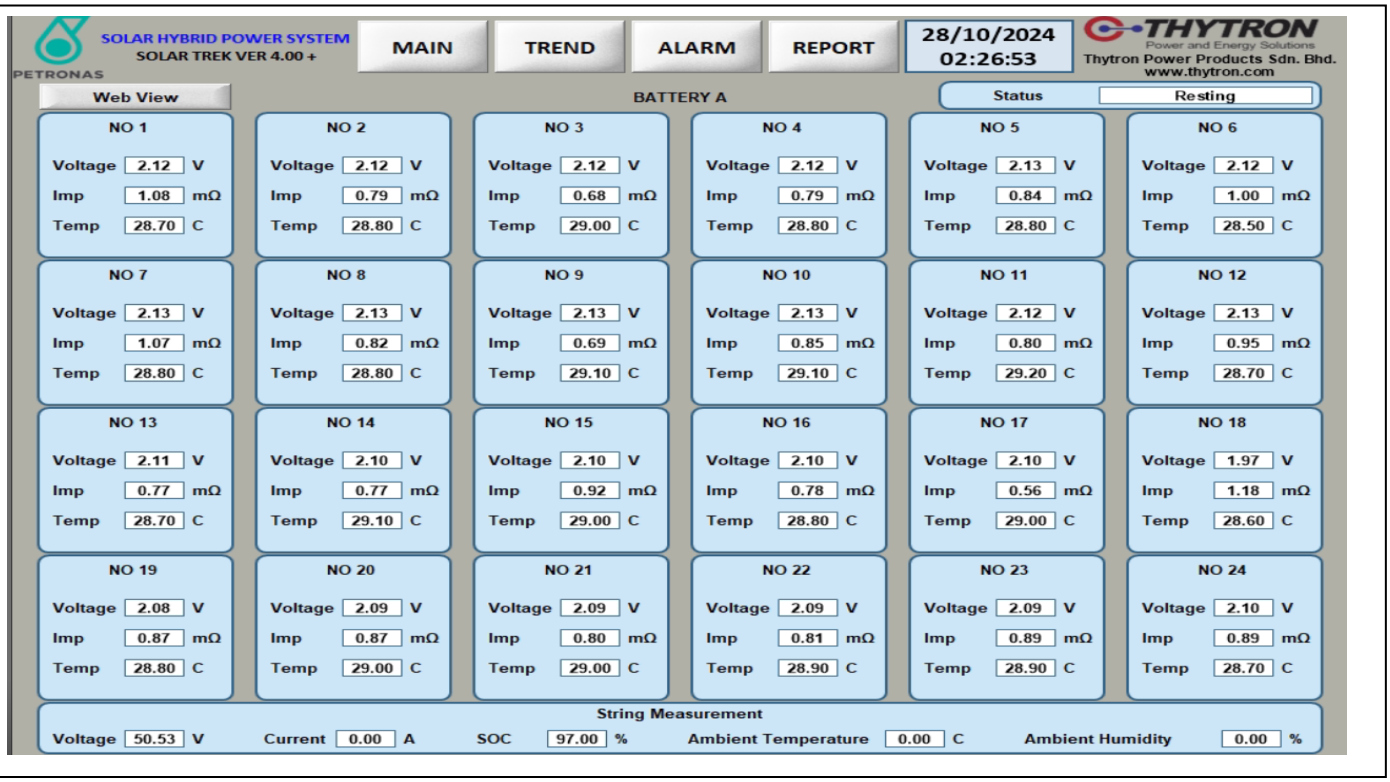
Solar Trek without BMS

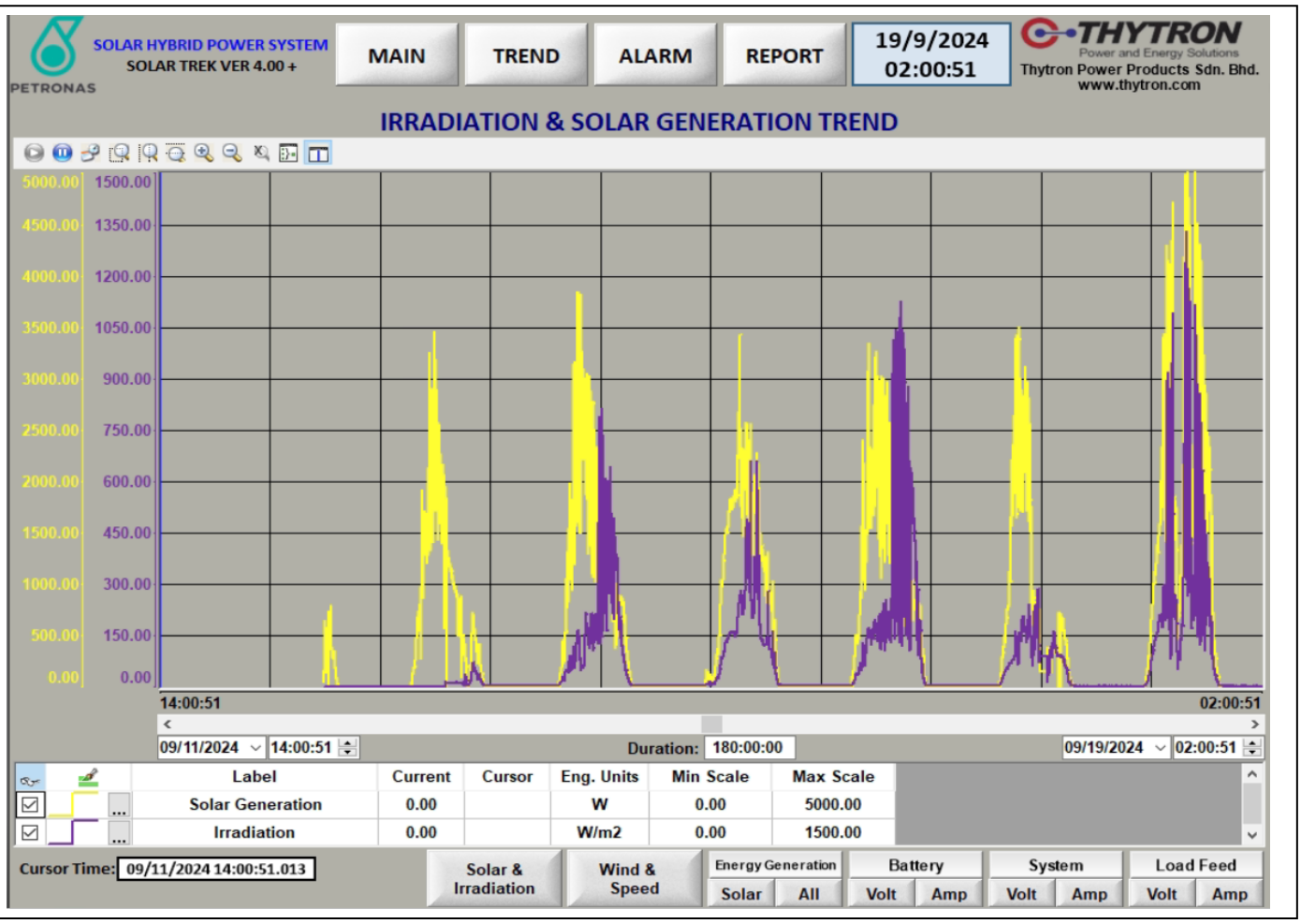

SCPA HYBRID POWER SYSTEM
PETRONAS CARIGALI SDN BHD
SOLAR TREK VER 3.14
MAIN
TREND
ALARM
REPORT
23/5/2024
12:28:07
THYTRON
Power and Energy Solutions
Thytron Power Products Sdn. Bhd.
www.thytron.com
User
CHARGER 0.00 W
WIND 0.00 W
SOLAR 289.93 W
RE LOAD 79.07 W
TOTAL LOAD 25.65 W
24VDC LOAD 25.65 W
HYBRID SYSTEM-A/B
HYBRID SYSTEM-C/D
PV-A1 69.44 V 0.83 A 1.08 A SCC-A1 820.00 Wh
PV-A2 0.00 V 0.00 A 0.00 A SCC-A2 0.00 Wh
PV-A3 0.00 V 0.00 A 0.00 A SCC-A3 0.00 Wh
PV-B1 67.82 V 1.46 A 1.74 A SCC-B1 900.00 Wh
PV-B2 0.00 V 0.00 A 0.00 A SCC-B2 0.00 Wh
PV-B3 0.00 V 0.00 A 0.00 A SCC-B3 0.00 Wh
PV-B4 0.00 V 0.00 A 0.00 A SCC-B4 0.00 Wh
PV-C1 67.84 V 1.59 A 2.06 A SCC-C1 610.00 Wh
PV-C2 0.00 V 0.00 A 0.00 A SCC-C2 0.00 Wh
PV-C3 0.00 V 0.00 A 0.00 A SCC-C3 0.00 Wh
PV-D1 68.69 V 0.03 A -0.01 A SCC-D1 190.00 Wh
PV-D2 0.00 V 0.00 A 0.00 A SCC-D2 0.00 Wh
PV-D3 0.00 V 0.00 A 0.00 A SCC-D3 0.00 Wh
FGS CB (1Q9)
FGS CB (2Q9)
FGS CB (3Q9)
FGS CB (4Q9)
54.80 V
1.08 A
55.37 W
54.80 V
1.74 A
118.10 W
54.80 V
2.06 A
116.46 W
54.88 V
-0.01 A
0.00 W
BC-01-AB
OFF
0.00 V
0.00 A
BC-01 CB (1Q14)
WT-A
54.70 V
0.00 A
0.00 W
32.35 °C
Alarm
WT-A CB (1Q11)
1LVLD1
LOAD CB (1Q15)
WIND SPEED WT-A
1.00 m/s
LOAD FEED A/B
54.72 Vdc
0.30 Adc
BATT.A CB (1Q12)
BATT.B CB (1Q13)
BATT. A 54.78 V 0.00 A
BATT. B 54.71 V 1.05 A
ALARM
MINOR
MAJOR
DB-710-48V
-51.80 V
1.44 A
79.07 W
CB OK
48V/24V DTD
-17.72 V
1.52 A
CB OK
DTD OK
IPS-01 INVERTER
0.00 V
0.00 A
CB OK
INV OK
230VAC LOAD
0.00 W
BC-02-CD
OFF
0.00 V
0.00 A
BC-02 CB (3Q14)
WT-B
55.20 V
0.00 A
0.00 W
32.35 °C
Alarm
WT-B CB (3Q11)
3LVLD1
LOAD CB (3Q15)
WIND SPEED WT-B
0.00 m/s
LOAD FEED C/D
54.76 Vdc
1.05 Adc
BATT.C CB (3Q12)
BATT.D CB (3Q13)
BATT. C 54.77 V 0.00 A
BATT. D 0.02 V 0.00 A
ALARM
MINOR
MAJOR
IRRADIATION
0.40 W/m²
AMBIENT TEMP.
30.80 °C

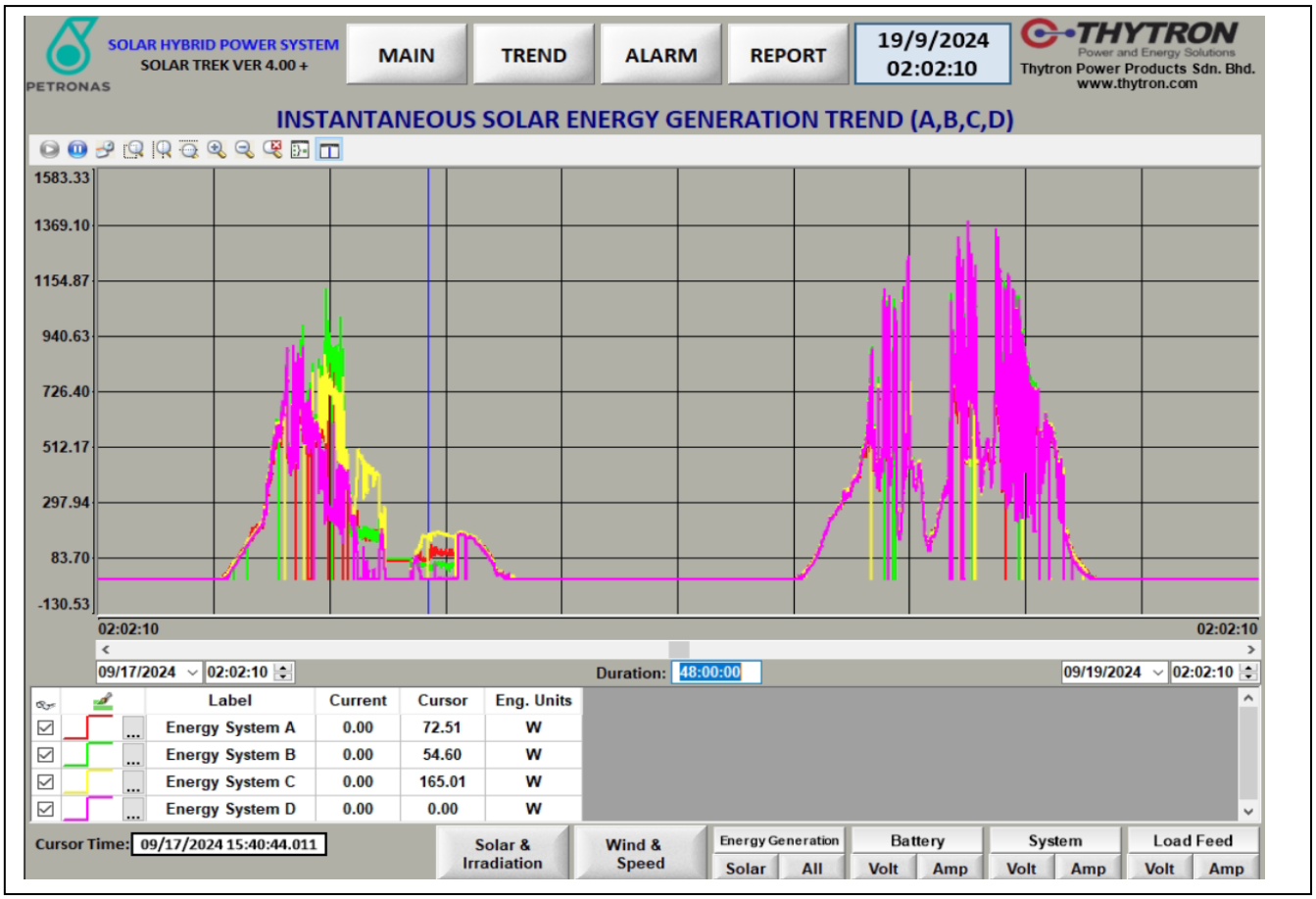
Solar Trek with BMS

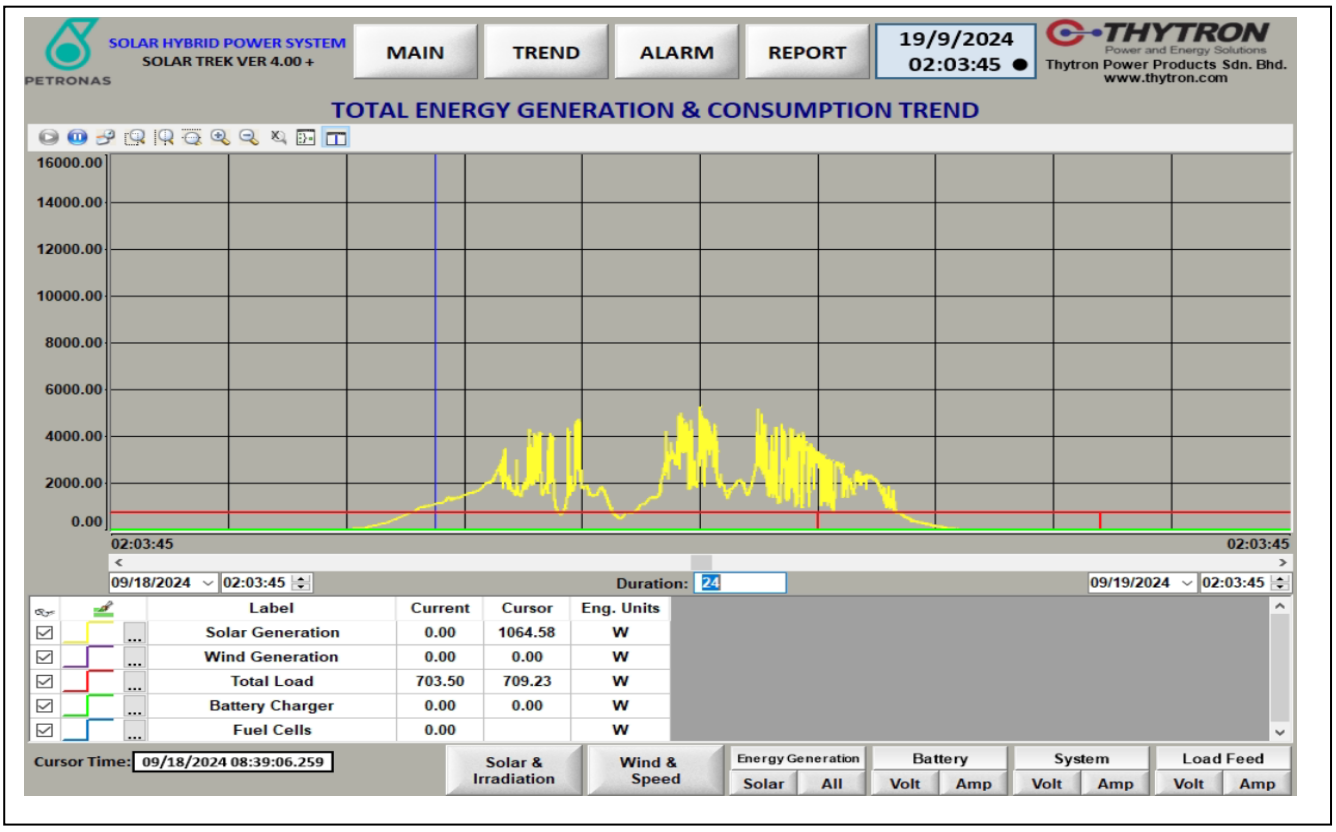




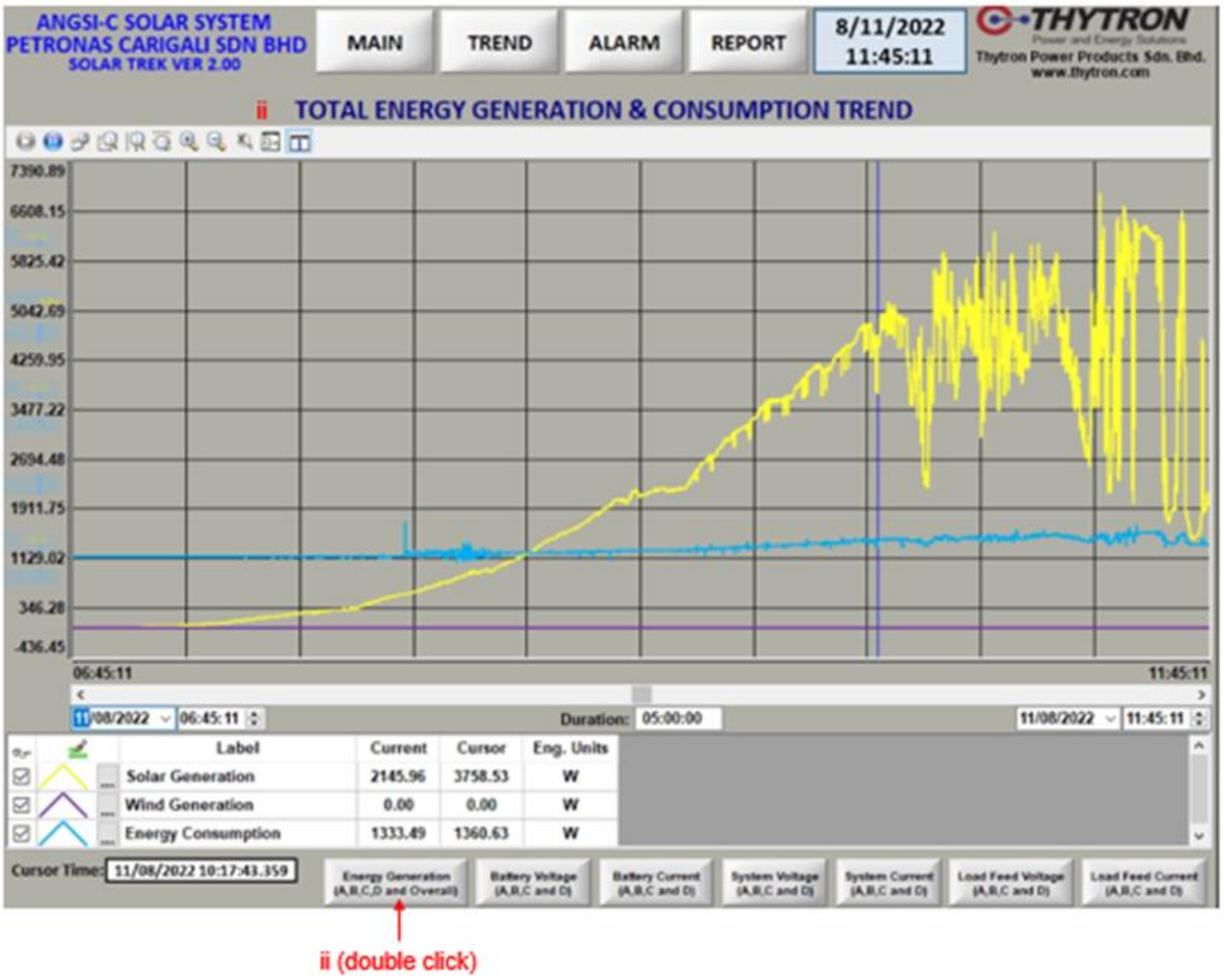

SOLAR HYBRID POWER SYSTEM
SOLAR TREK VER 4.00 +
PETRONAS
MAIN
TREND
ALARM
REPORT
28/10/2024
02:26:53
THYTRON
Power and Energy Solutions
Thytron Power Products Sdn. Bhd.
www.thytron.com
Web View
BATTERY A
Status
Resting
NO 1 Voltage 2.12 V Imp 1.08 mΩ Temp 28.70 C
NO 2 Voltage 2.12 V Imp 0.79 mΩ Temp 28.80 C
NO 3 Voltage 2.12 V Imp 0.68 mΩ Temp 29.00 C
NO 4 Voltage 2.12 V Imp 0.79 mΩ Temp 28.80 C
NO 5 Voltage 2.13 V Imp 0.84 mΩ Temp 28.80 C
NO 6 Voltage 2.12 V Imp 1.00 mΩ Temp 28.50 C
NO 7 Voltage 2.13 V Imp 1.07 mΩ Temp 28.80 C
NO 8 Voltage 2.13 V Imp 0.82 mΩ Temp 28.80 C
NO 9 Voltage 2.13 V Imp 0.69 mΩ Temp 29.10 C
NO 10 Voltage 2.13 V Imp 0.85 mΩ Temp 29.10 C
NO 11 Voltage 2.12 V Imp 0.80 mΩ Temp 29.20 C
NO 12 Voltage 2.13 V Imp 0.95 mΩ Temp 28.70 C
NO 13 Voltage 2.11 V Imp 0.77 mΩ Temp 28.70 C
NO 14 Voltage 2.10 V Imp 0.77 mΩ Temp 29.10 C
NO 15 Voltage 2.10 V Imp 0.92 mΩ Temp 29.00 C
NO 16 Voltage 2.10 V Imp 0.78 mΩ Temp 28.80 C
NO 17 Voltage 2.10 V Imp 0.56 mΩ Temp 29.00 C
NO 18 Voltage 1.97 V Imp 1.18 mΩ Temp 28.60 C
NO 19 Voltage 2.08 V Imp 0.87 mΩ Temp 28.80 C
NO 20 Voltage 2.09 V Imp 0.87 mΩ Temp 29.00 C
NO 21 Voltage 2.09 V Imp 0.80 mΩ Temp 29.00 C
NO 22 Voltage 2.09 V Imp 0.81 mΩ Temp 28.90 C
NO 23 Voltage 2.09 V Imp 0.89 mΩ Temp 28.90 C
NO 24 Voltage 2.10 V Imp 0.89 mΩ Temp 28.70 C
String Measurement
Voltage 50.53 V Current 0.00 A SOC 97.00 % Ambient Temperature 0.00 C Ambient Humidity 0.00 %


SOLAR HYBRID POWER SYSTEM
SOLAR TREK VER 4.00 +
PETRONAS
MAIN
TREND
ALARM
REPORT
19/9/2024
02:00:51
THYTRON
Power and Energy Solutions
Thytron Power Products Sdn. Bhd.
www.thytron.com
IRRADIATION & SOLAR GENERATION TREND
5000.00 1500.00
4500.00 1350.00
4000.00 1200.00
3500.00 1050.00
3000.00 900.00
2500.00 750.00
2000.00 600.00
1500.00 450.00
1000.00 300.00
500.00 150.00
0.00 0.00
14:00:51
02:00:51
09/11/2024 14:00:51
Duration: 180:00:00
09/19/2024 02:00:51
Label Current Cursor Eng. Units Min Scale Max Scale
Solar Generation 0.00 W 0.00 5000.00
Irradiation 0.00 W/m2 0.00 1500.00
Cursor Time: 09/11/2024 14:00:51.013
Solar & Irradiation
Wind & Speed
Energy Generation
Solar
All
Battery
Volt
Amp
System
Volt
Amp
Load Feed
Volt
Amp

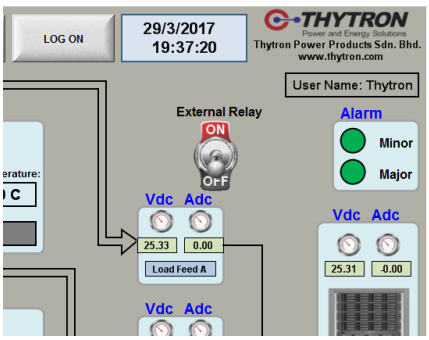


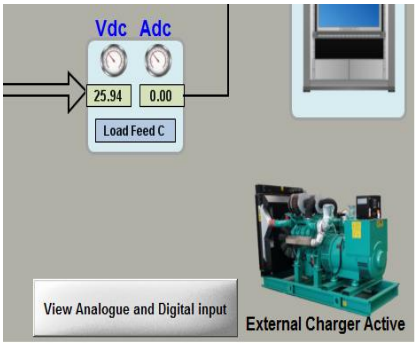


System Trending with Solar & Irradiation Generation, Wind & Speed Generation, Energy Generation, Battery Voltage & Current, System Voltage & Current, Load Feed Voltage & History Record .



External Control (External Relay Switch with External Charger Active control)





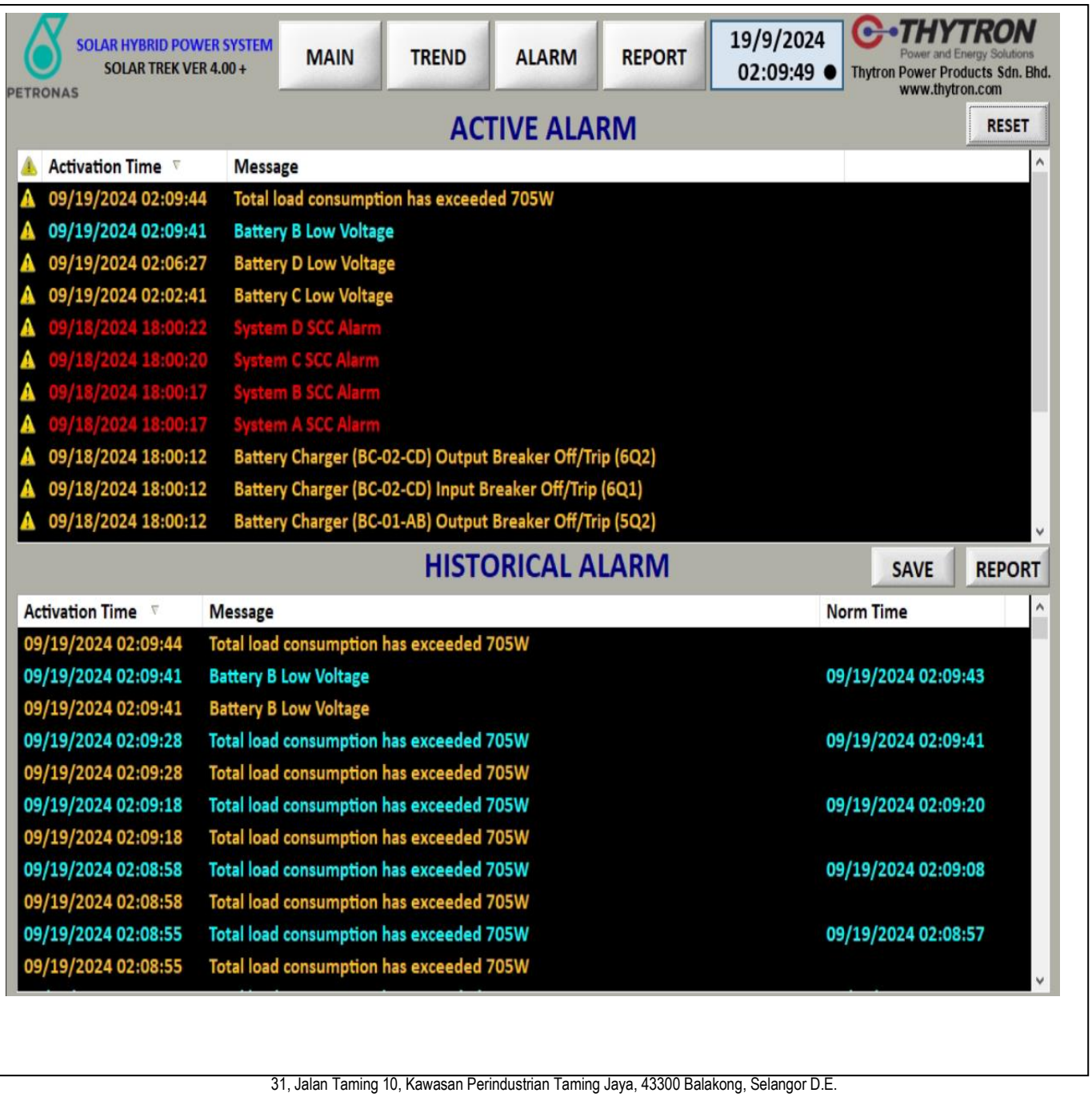
Alarm Screen

Two types of Alarm are provided in the system:

Minor Alarm is the alarm to notify user for any non-critical alarm and the alarm is automatically resettable once the alarm disappears.

Major Alarm is the alarm to notify user for any critical alarm and the alarm is automatically resettable once the alarm is disappeared.

Historical Alarm: Major & Minor alarm is captured into resettable Historical Event, more than 2000 historical data will be stored into the SSD of the industrial server. The historical data can be printed.

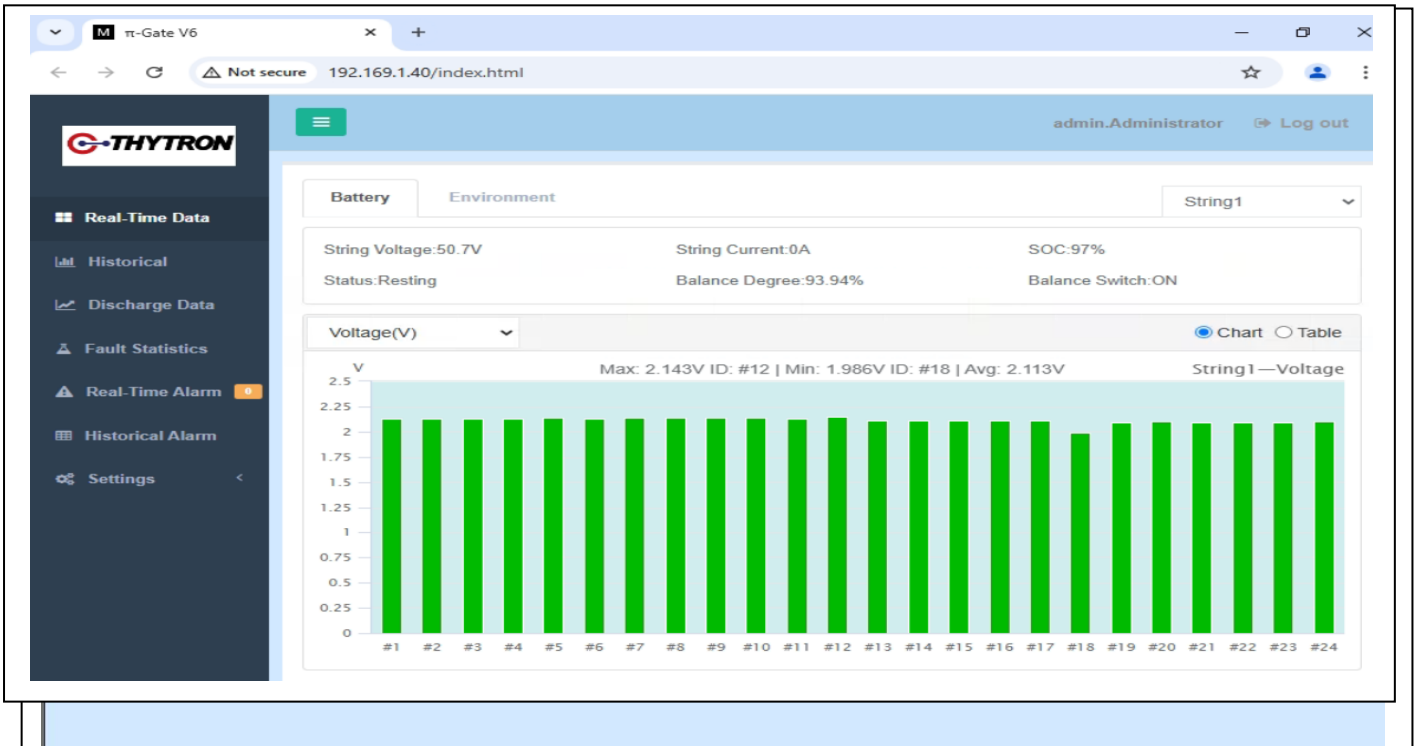


Inverter Live Web View Page

The Inverter Live Web View Page provides real-time monitoring and management capabilities for the inverter system

Accessing the Page: To access the Inverter Live Web View Page, use the button provided in the HMI interface. This button will seamlessly redirect you to the web page for instant monitoring and control.

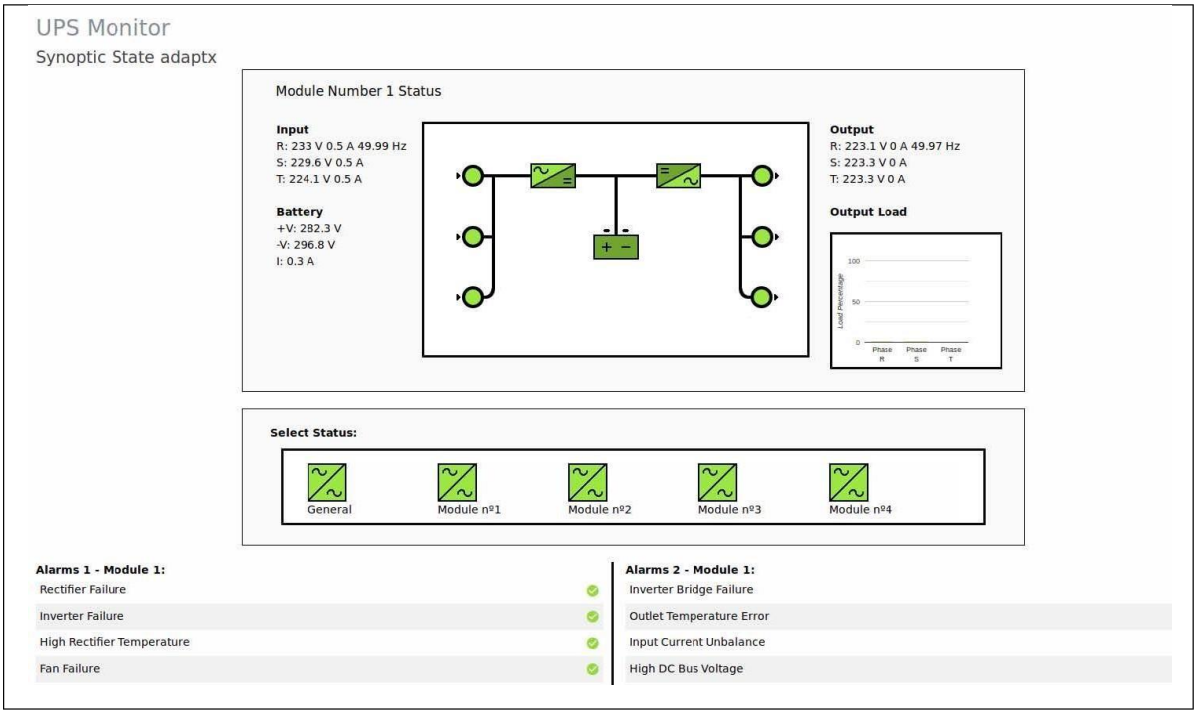
Battery Monitoring System Live Web View Page



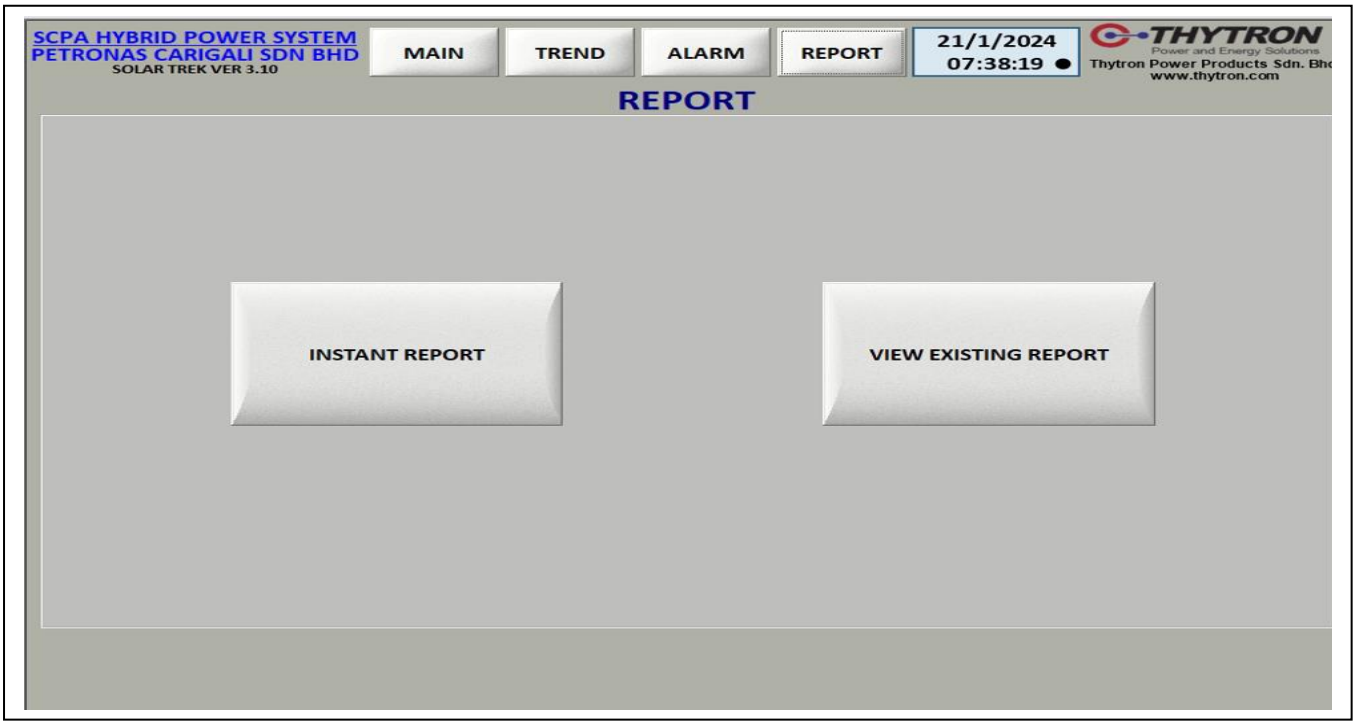
Rectifier Live Web View Page

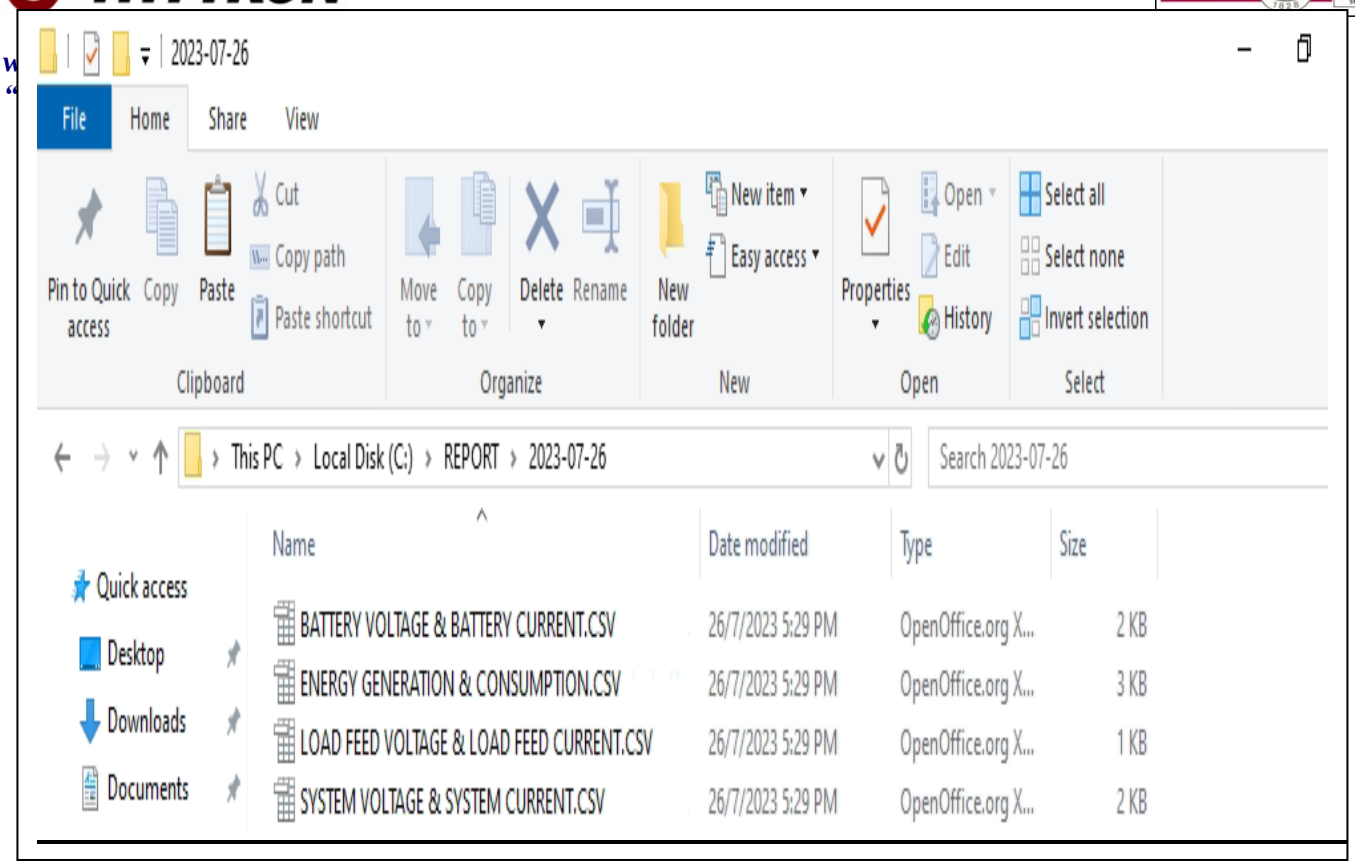
The Rectifier Live Web View Page provides real-time monitoring for the rectifier system.

Accessing the Page: To access the Rectifier Live Web View Page, use the button provided in the HMI interface. This button will seamlessly redirect you to the web page for instant monitoring and control.



Reporting





Example of Battery Voltage and Current Table:

Time	Battery A Voltage(V)	Battery A Current(A)	System A Voltage(V)	System A Current(A)
0:08:21	25.96	0.05	25.96	0.05
2:01:26	25.93	0.05	25.93	0.05
3:01:26	25.92	0.03	25.92	0.03
4:01:26	25.92	0.03	25.92	0.03
5:01:26	25.91	0.02	25.91	0.02
6:01:26	25.9	0.02	25.9	0.02
7:01:26	25.89	0.03	25.89	0.03
8:01:26	26.35	3.69	26.35	3.69
9:01:26	27.83	7.26	27.83	7.26
10:01:26	27.77	7.35	27.77	7.35
11:01:26	27.77	6.6	27.77	6.6
12:01:26	27.12	5.46	27.12	5.46
13:01:26	27.11	4.81	27.11	4.81
14:01:26	27.06	4.41	27.06	4.41
15:01:26	27	4	27	4

Example of Energy Generation & Consumption:

Time	SCCA1(W)	SCCB1(W)	SCCC1(W)	SCCD1(W)	Total Solar(W)	Irradiation (W/m²)	WS-B(m/s)	WT-B(W)	Total Wind(W)	24VDC Load(W)	Total Load(W)
9:00	96.9	97.45	98.66	91.63	384.63	60.1	7	250	250	24.82	24.82
9:01	98	94.7	100.09	87.89	380.68	60.4	6	290	290	20.15	20.15
9:02	100.2	95.14	102.72	93.38	391.44	60.6	7	240	240	25.66	25.66
9:03	99.1	97.34	101.62	90.53	388.59	60.2	6	350	350	21.01	21.01
9:04	100.42	97.78	103.38	91.85	392.98	60.1	5	140	140	23.53	23.53
9:05	107.12	102.94	106.24	100.31	418.58	60.9	7	90	90	20.15	20.15
9:06	106.68	108.33	108.33	102.39	425.72	62.6	6	190	190	19.75	19.75
9:07	107.56	113.16	116.24	105.58	442.53	60.8	7	290	290	20.64	20.64
9:08	112.39	114.37	117.11	106.79	450.66	61.5	6	140	140	24.38	24.38
9:09	114.37	120.3	123.49	109.2	467.36	61.9	7	240	240	17.68	17.68
9:10	115.14	121.18	126.78	115.91	479	61.9	7	240	240	24.39	24.39
9:11	118.21	125.68	132.28	114.7	488.12	62.5	6	240	240	20.57	20.57
9:12	118.98	123.6	119.2	120.74	482.52	63.9	7	290	290	19.35	19.35
9:13	119.09	127.66	129.31	119.2	495.26	64.2	4	120	120	23.94	23.94
9:14	120.85	130.63	132.82	118.43	502.73	62.4	7	400	400	17.68	17.68
9:15	140.41	140.52	140.08	135.46	556.46	58.6	5	240	240	23.53	23.53
9:16	129.86	140.41	144.58	130.08	544.92	72.6	5	140	140	19.78	19.78
9:17	137.99	141.06	142.71	128.98	557.34	68.8	6	400	400	20.63	20.63
9:18	151.72	153.59	143.15	149.41	597.88	66	7	240	240	24.38	24.38
9:19	151.5	153.26	153.7	145.57	604.03	67.5	6	240	240	22.27	22.27
9:20	154.69	155.68	155.24	151.72	617.32	63.7	7	140	140	18.51	18.51

- This report can be stored on a local disk for up to 2 years.
- Users can perform manual trend analysis using the data presented in this table, enabling customized exploration of patterns and fluctuations.
- The data is stored locally on disk ensures easy access and retrieval whenever needed.
- Users can quickly retrieve historical data from the table without relying on external data sources or network connectivity.