



**SOUTHERN LEYTE
STATE UNIVERSITY**

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

Annex B

SOLAR POWER AND UPGRADING OF ELECTRICAL SYSTEM





DC Parameters

Battery type	Lithium iron phosphate (LFP)
Rated Capacity	261kWh
Cycle Life	8000 cycles @ (0.5P/0.5P, DOD90%, 70%EOL)
Configuration	1P260S
Rated Voltage	832V(25°C ± 2°C)
Voltage Range	728V ~ 936V
Max Charging Power	0.5P
Max Discharging Power	0.5P

AC Parameters

Rated Power	125kW
Max Power	137.5kVA
Rated Voltage	230V/400V
Voltage Deviation	-15%~+15%
Rated Frequency	50/60Hz
Current THD	<2% (rated power)
Power Factor	1 (leading) ~1 (lagging)
AC Output Type	Three-phase four-wire

System Parameters

Operating Temperature	0°C~55°C (charging) , -20°C~55°C (discharging)
Humidity Range	5% ~ 95%,RH
Operating Altitude	<2000m
IP Rating	IP54
Cooling Method	Liquid-cooled
Fire Extinguishing Agent	Aerosol
Dimensions (W×D×H)	1000*1350*2400(mm)
Weight	2600±50kg
Communication	RS485/CAN/ Ethernet

Liquid Cooled Energy Storage Integrated System





**SOUTHERN LEYTE
STATE UNIVERSITY**

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

Figure 2 Product Dimensions

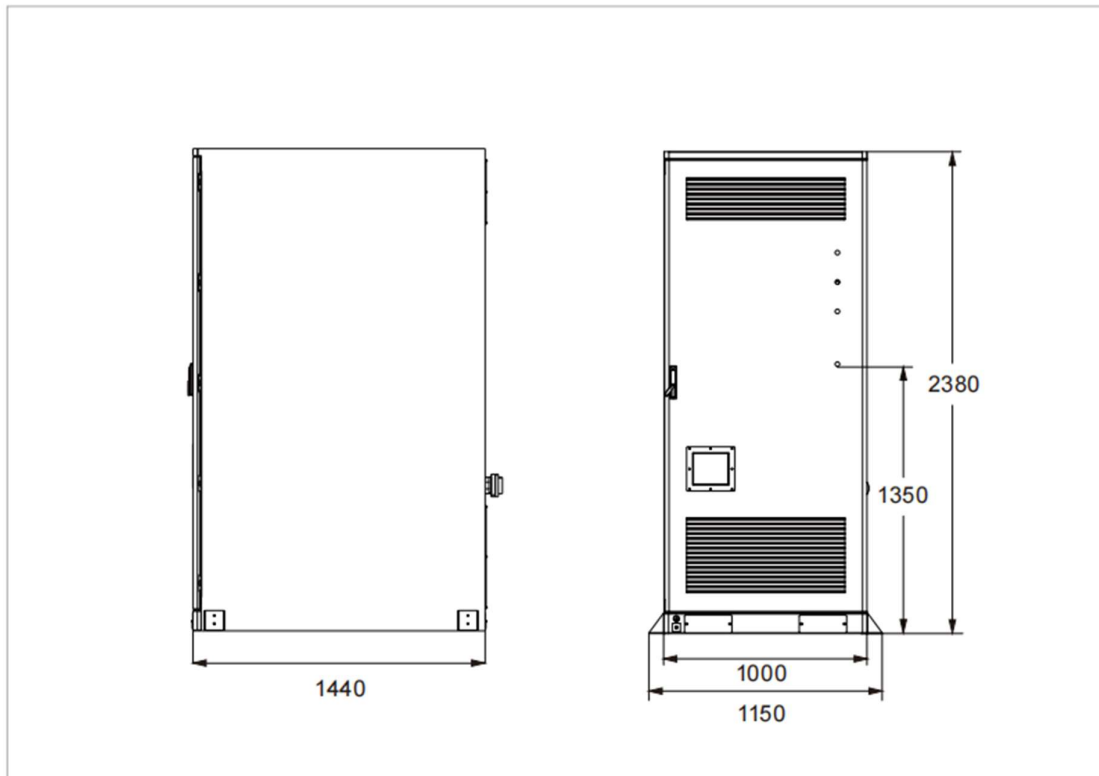




Figure 3 Schematic Diagram of the Product Structure

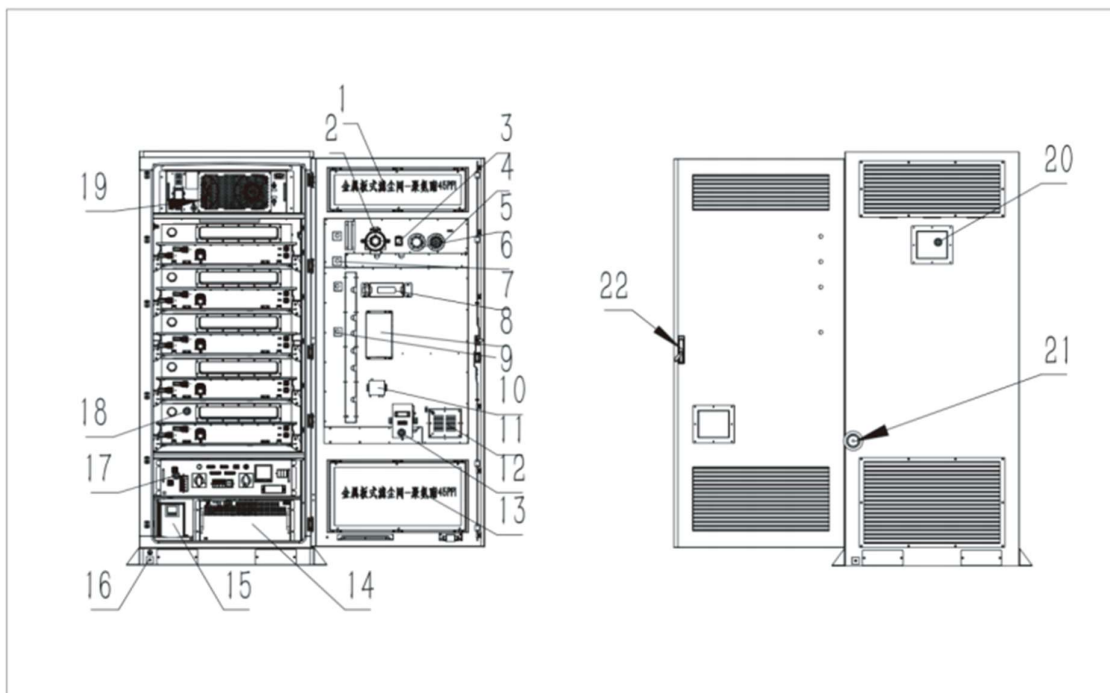




Table 1 Name of System Components

S/N	Name	S/N	Name
1	Air inlet of the liquid cooler	12	Dehumidifier
2	Hydrogen detector	13	PCS air inlet
3	Relay	14	PCS
4	Fire temperature detector	15	UPS
5	Fire smoke detector	16	Earth connection point
6	Indicator	17	High-voltage control box
7	Aerosol fire extinguisher	18	Battery module
8	EMS	19	Water cooler
9	Emergency stop button	20	Fire exhaust fan
10	4G module	21	Fire water filling nozzle (KN65)
11	Fire inlet fan	22	Front door lock



Figure 4 Electrical Schematic Diagram of the Product

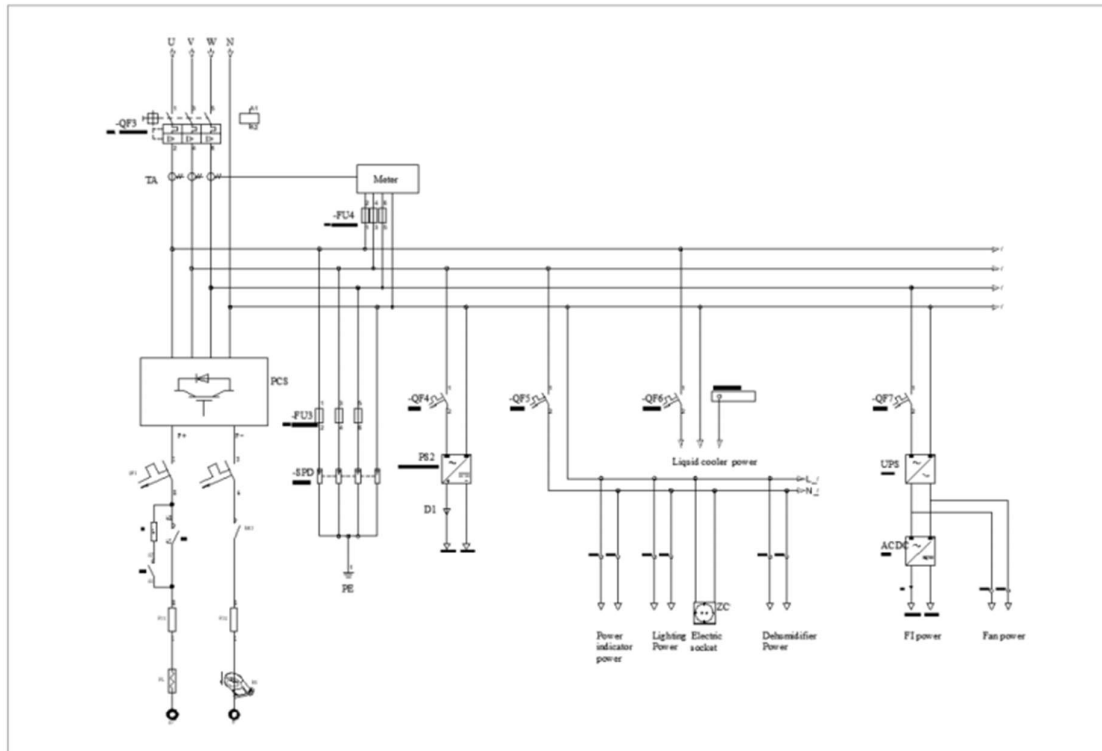
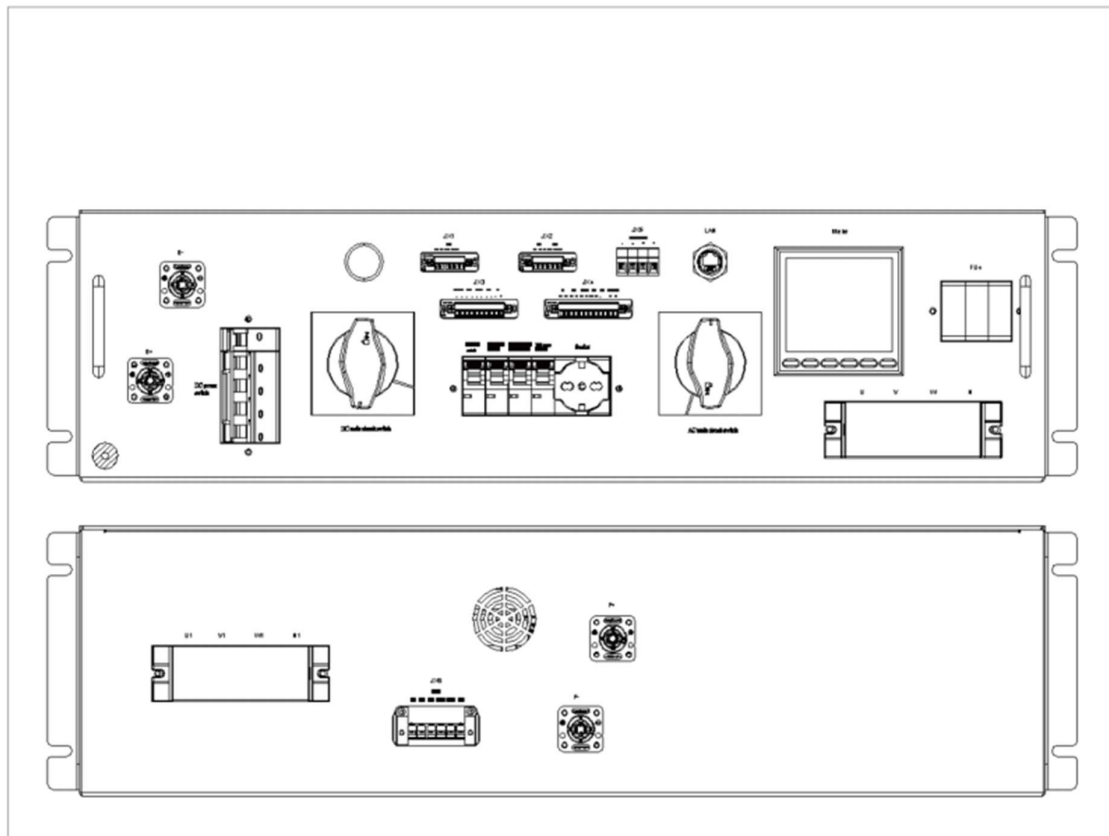


Figure 5 Schematic Diagram of High-voltage box Panel





**SOUTHERN LEYTE
STATE UNIVERSITY**

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

Table 2 List of Components of High-voltage box Panel

S/N	Name	Label	Feature description
1	Air switch	AC power switch	Air switch for AC power
2	Air switch	Other power switch	Air switch for Other power
3	Air switch	Liquid cooler power switch	Air switch for Liquid cooler power
4	Air switch	UPS power switch	Air switch for UPS power
5	Electric socket	AC220V	AC Electric socket
6	Air switch	DC power switch	Air switch for DC power
7	Circuit breaker	DC main circuit switch	DC connection switch
8	Circuit breaker	AC main circuit switch	AC connection switch





**SOUTHERN LEYTE
STATE UNIVERSITY**

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

Figure 8 Schematic Diagram of Battery Pack

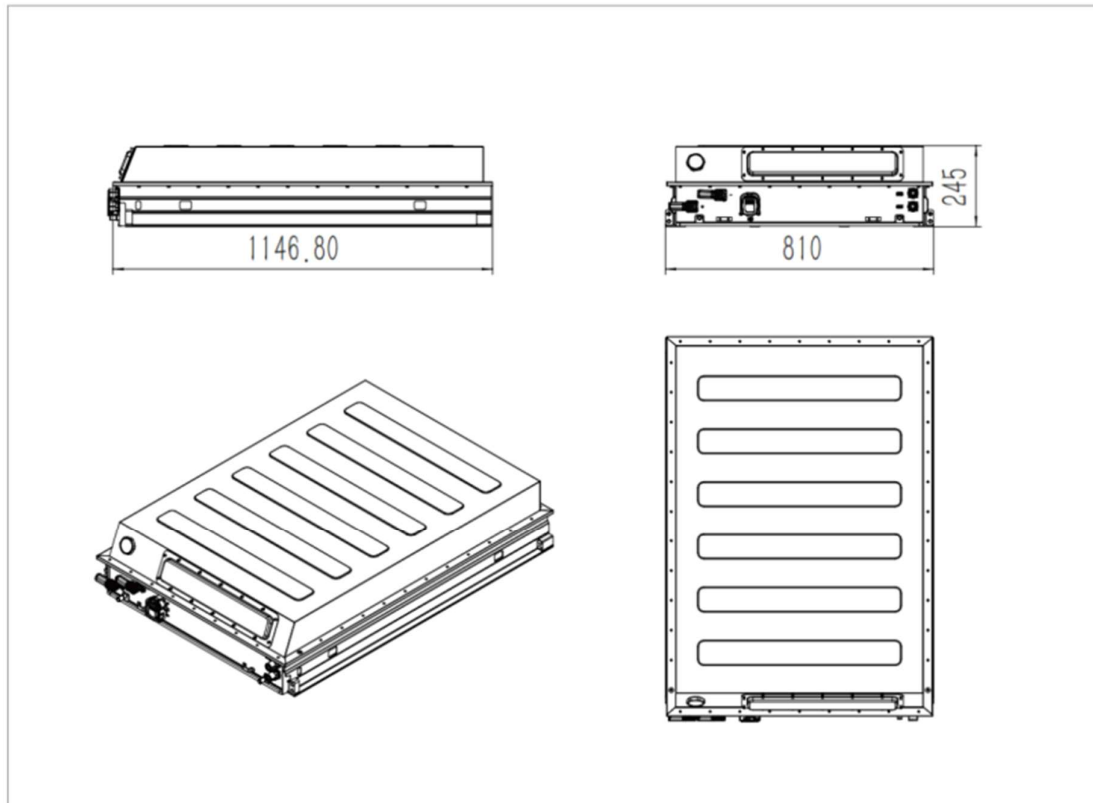




Table 5 Specifications of Battery Pack

S/N	Item	Specifications
1	Series or parallel connection mode	1P52S
2	Nominal voltage	166.4V
3	Rated capacity	314 Ah
4	Rated energy	52.25kWh
5	Discharge cut-off voltage	145.6 V
6	Charge cut-off voltage	187.2V
7	Rated charge current	157A
8	Rated discharge current	157A
9	Equalization mode	Active equalization
10	Protection grade	IP67
11	Insulation resistance	$\geq 10M\Omega$
12	Dimension	L1146.8*W810*H245mm
13	Weight	345 \pm 10kg



SOUTHERN LEYTE
STATE UNIVERSITY

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

Figure 9 Schematic Diagram of Liquid Cooler

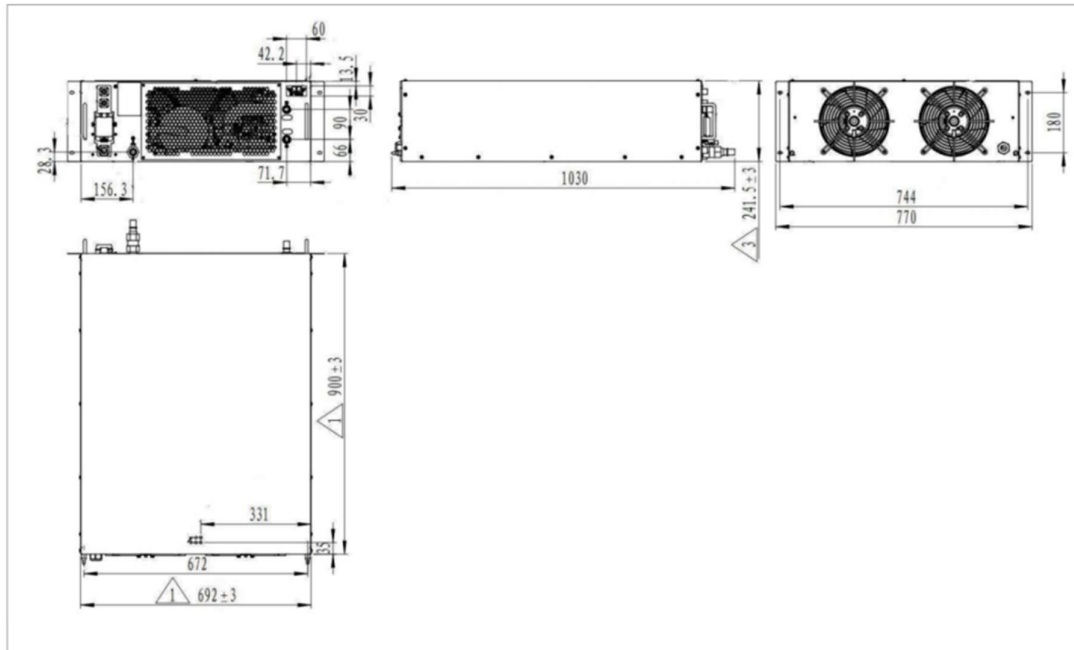


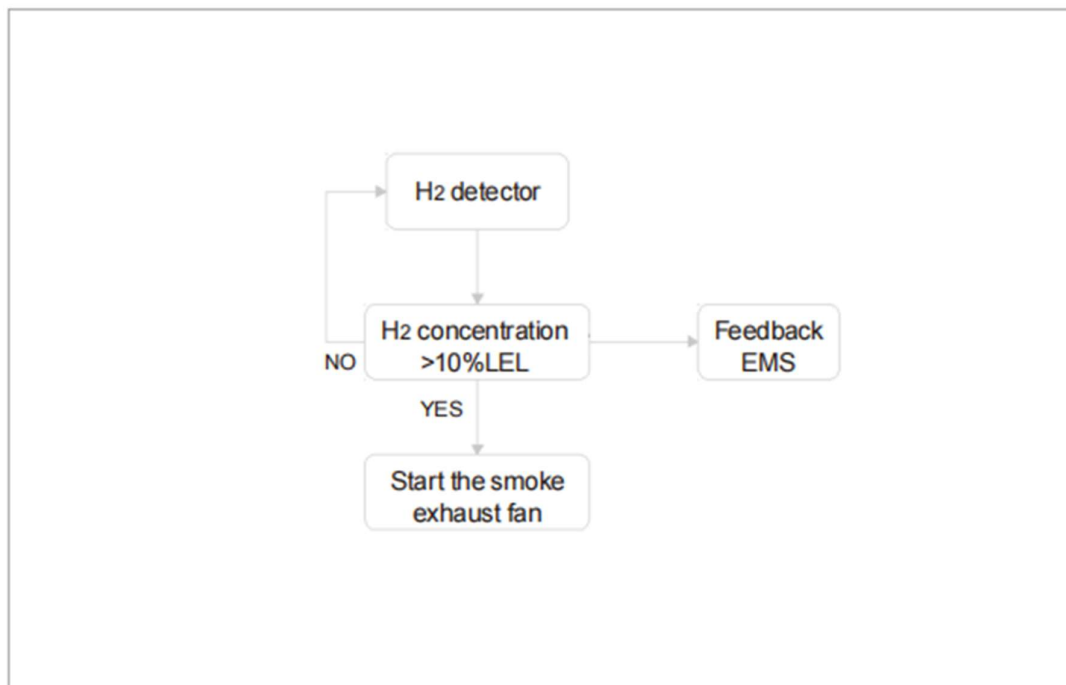


Table 6 Technical Parameters of Liquid Cooler

S/N	Item	Parameter
1	Rated voltage (V)	AC 220V \pm 10%
2	Rated frequency (Hz)	50/60
3	Rated refrigerating capacity (kW)	5.0
4	Cooling power power (kW)	2.0
5	Cooling current (A)	9.3
6	Add heat(kW)	2.0
7	Heating power (kW)	2.2
8	Heating current (A)	10.3
9	Water supply pump power (W)	200
10	Rated flow (L/min)	30
11	Size of water inlet and outlet (mm)	NW22
12	Liquid temperature setting range (°C)	15~35
13	Liquid temperature control accuracy (°C)	\pm 1
14	Ambient temperature (°C)	-30~50
15	Refrigerant (kg)	R410A
16	Noise (dB)	\leq 72
17	Protection grade	IP55
18	Net weight (kg)	\leq 70
19	Outer dimension (mm)	WxDxH: 700x900x245
20	Applicable cooling medium	Ethylene glycol aqueous solution with the concentration \leq 60%



4.3 Fire protection system





SOUTHERN LEYTE STATE UNIVERSITY

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



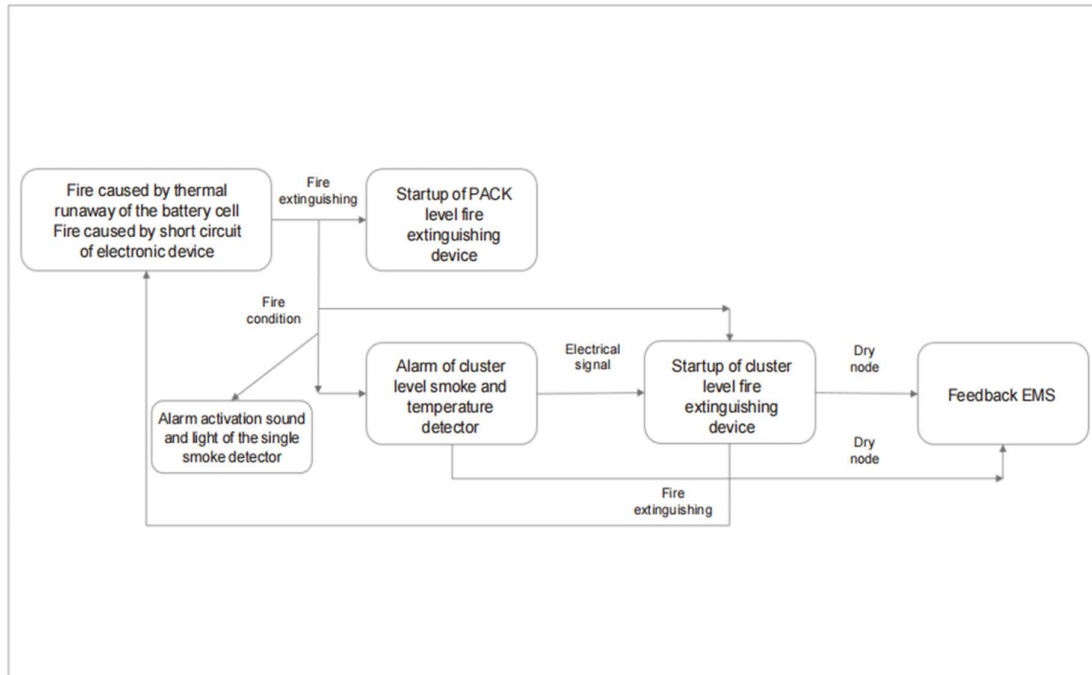
Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

S/N	Name	Technical parameters
H2 detector		
1	Rated voltage	DC24V
2	Ranges Available	0-100% LEL
3	Operating temperature range	-40°C ~ +70°C
Explosion-proof smoke exhaust fan		
1	Rated voltage	AC220V 50Hz
2	Maximum air volume	106CFM±10%
3	Protection level	IP66
4	Operating temperature range	-40°C ~ +80°C
Explosion-proof inlet fan		
1	Rated voltage	DC24V
2	Protection level	IP66
3	Operating temperature range	-40°C ~ +80°C





Figure 10 Schematic Diagram of Fire Protection





SOUTHERN LEYTE STATE UNIVERSITY

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

S/N	Name	Technical parameters
1	Operating voltage range	DC 9~33V
2	Rated voltage	DC 24V
3	Operating temperature	Main machine for the fire prevention and control device -40℃~55℃ Detection module: -20℃~+70℃
4	Operating humidity	<90%RH
5	Fire extinguishing startup current	>0.5A (50ms)
6	Temperature measurement range	-40℃~125℃
7	Fire-extinguishing media	Aerosol
8	Fire extinguishing object	Lithium iron phosphate battery
9	Fire control and extinguishing mode	Electrical startup
10	Fire extinguishing device startup time	≤2s
11	Fire extinguishing device spray time	≤15s
12	Fire detection method	Composite temperature and smoke detection
13	Alarm function	Sound-light alarm






SOUTHERN LEYTE
STATE UNIVERSITY

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

Table 10 Packing List of the Battery

S/N	Name	Legend	Quantity
1	Cabinet		1



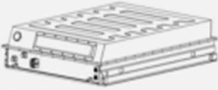

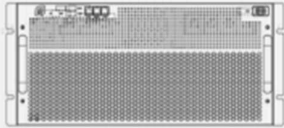
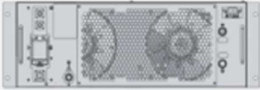



SOUTHERN LEYTE STATE UNIVERSITY

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

S/N	Name	Legend	Quantity
2	Battery		8
3	High-voltage control box		1
4	Inverter		1
5	Liquid cooler		1
6	Fire protection system		1



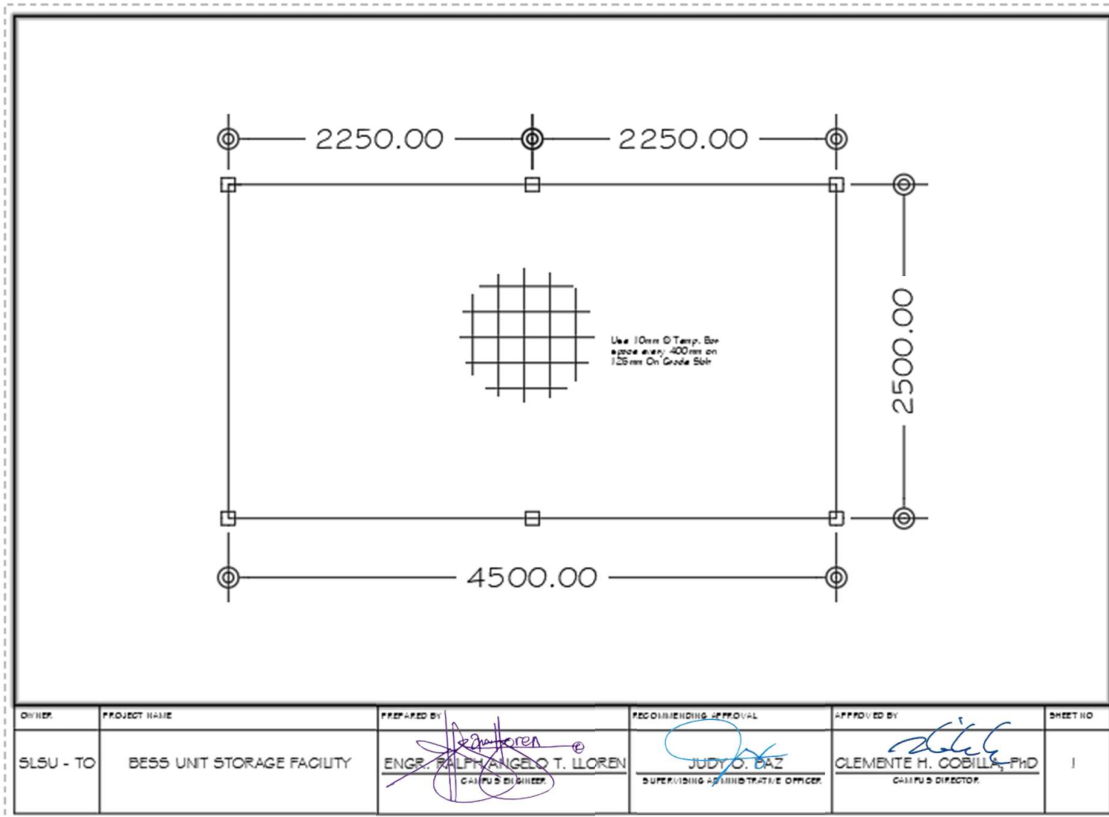


SOUTHERN LEYTE STATE UNIVERSITY

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality



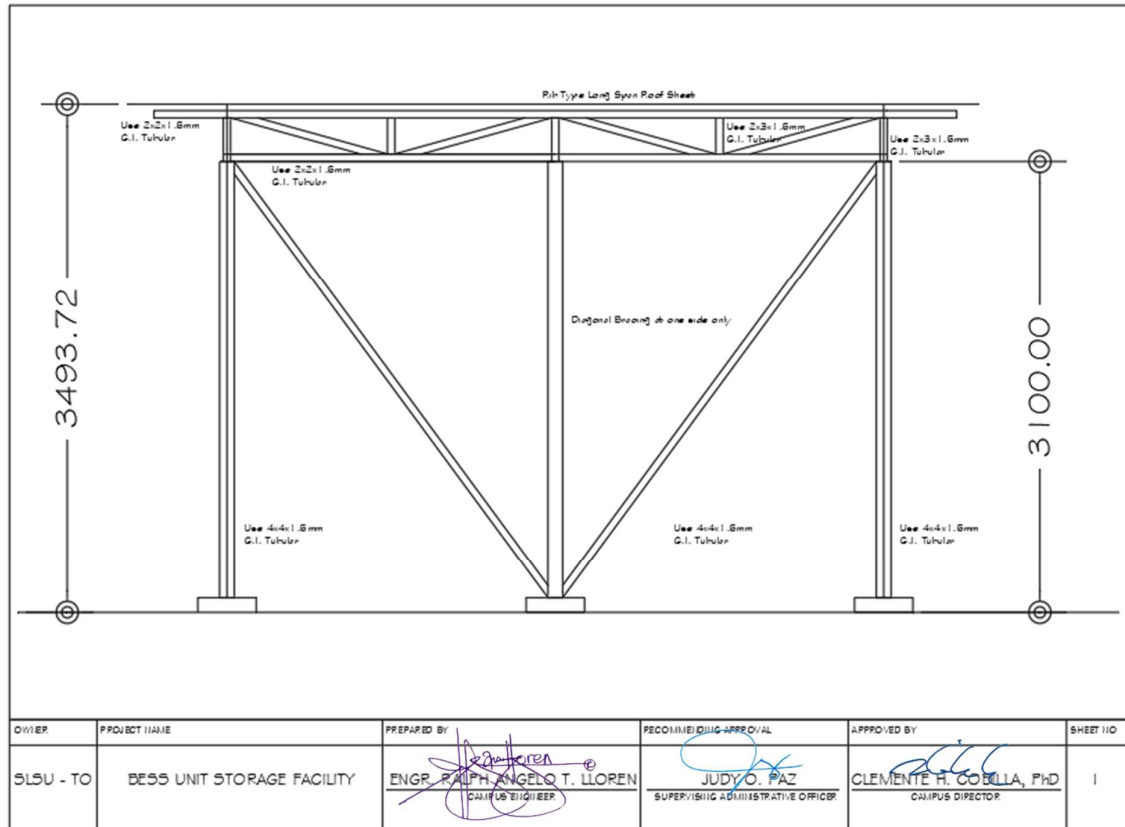


SOUTHERN LEYTE STATE UNIVERSITY

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality



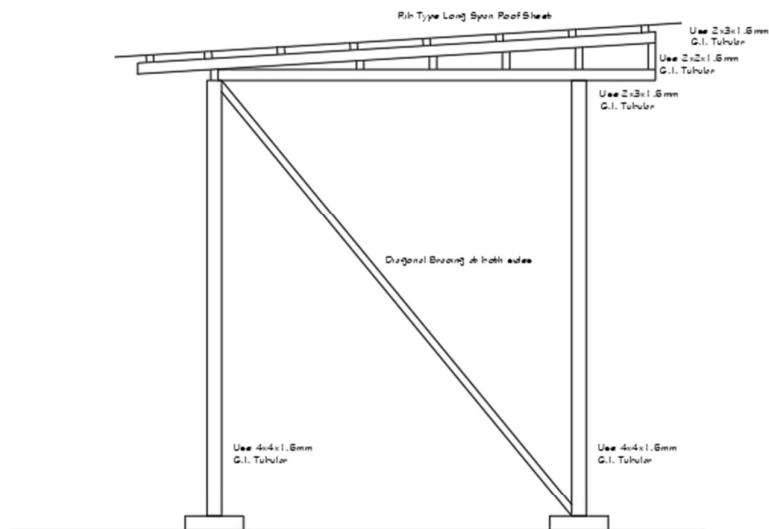


SOUTHERN LEYTE STATE UNIVERSITY

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality



DIVISION	PROJECT NAME	PREPARED BY	RECOMMENDING APPROVAL	APPROVED BY	SHEET NO.
SLSU - TO	BESS UNIT STORAGE FACILITY	ENGR. RICHARDO T. FLOREN CAMPUS ENGINEER	JUDY O. PAZ SUPERVISING ADMINISTRATIVE OFFICER	CLEMENTE H. COBILLA, PhD CAMPUS DIRECTOR	1





SOUTHERN LEYTE STATE UNIVERSITY

Tomas Oppus Campus, San Isidro, Tomas Oppus, Southern Leyte
Email: tomas_oppus@southernleytestateu.edu.ph
Website: www.southernleytestateu.edu.ph



Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

