

PROJECT DESCRIPTION:	
SYSTEM SIZE	5.00KW DC STC & 5 KW AC
MODULE TYPE	(10) LONGI SOLAR LR5-66HIH-500M 500W
INVERTER TYPE	(1) GINLONG (SOLIS) S6-GR1P5K INVERTER

INDEX SHEET	
A.00	SITE PLAN
A.01	LAYOUT PLAN
S.00	STRING LAYOUT
S.01	FRAMING LAYOUT
E.00	ELECTRICAL LINE DIAGRAM
D.00-D.04	SPECIFICATION SHEET



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BUSINESS ESTATE
ANTHONY'S WAY,
ROCHESTER, KENT
ME2 4NP

PRO. DATE	25/05/2023
DESIGN BY	DR
CHECKED BY	JD

PROJECT NAME

DISPENSARY

SHEET NAME

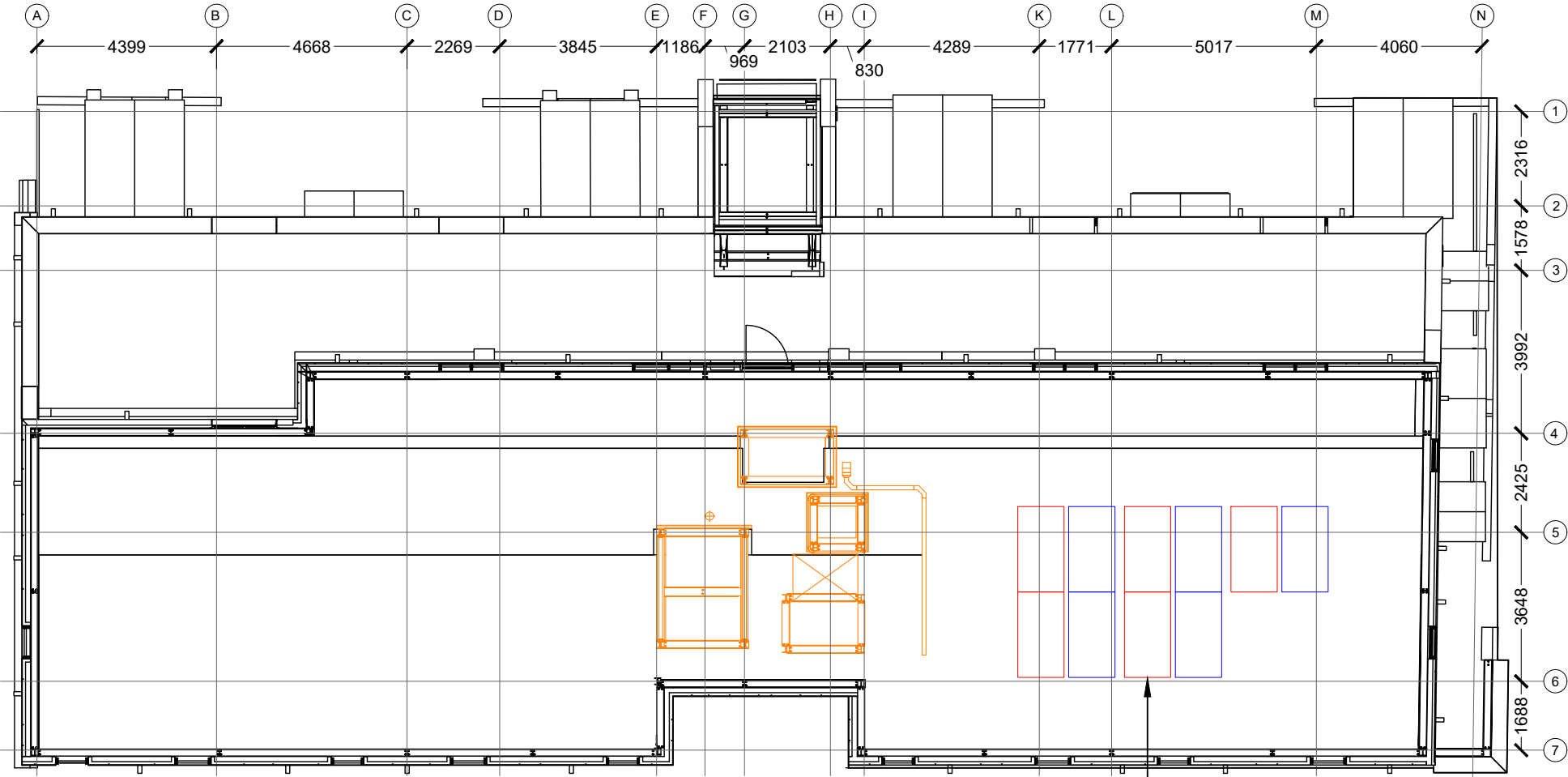
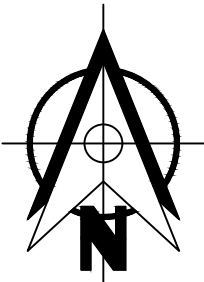
SITE PLAN

SHEET SIZE

ANSI B
279 X 432

SHEET NUMBER

A.00



1 SITE PLAN
SCALE:- 1:150

MODULES AREA & ROOF AREA CALC'S			
# OF MODULES	MODULES AREA (Sq. Meter)	ROOF AREA (Sq. Meter)	ROOF AREA COVERED BY MODULES (%)
10	23.70	497.84	4.76

LEGENDS

EAST FACING MODULE

WEST FACING MODULE



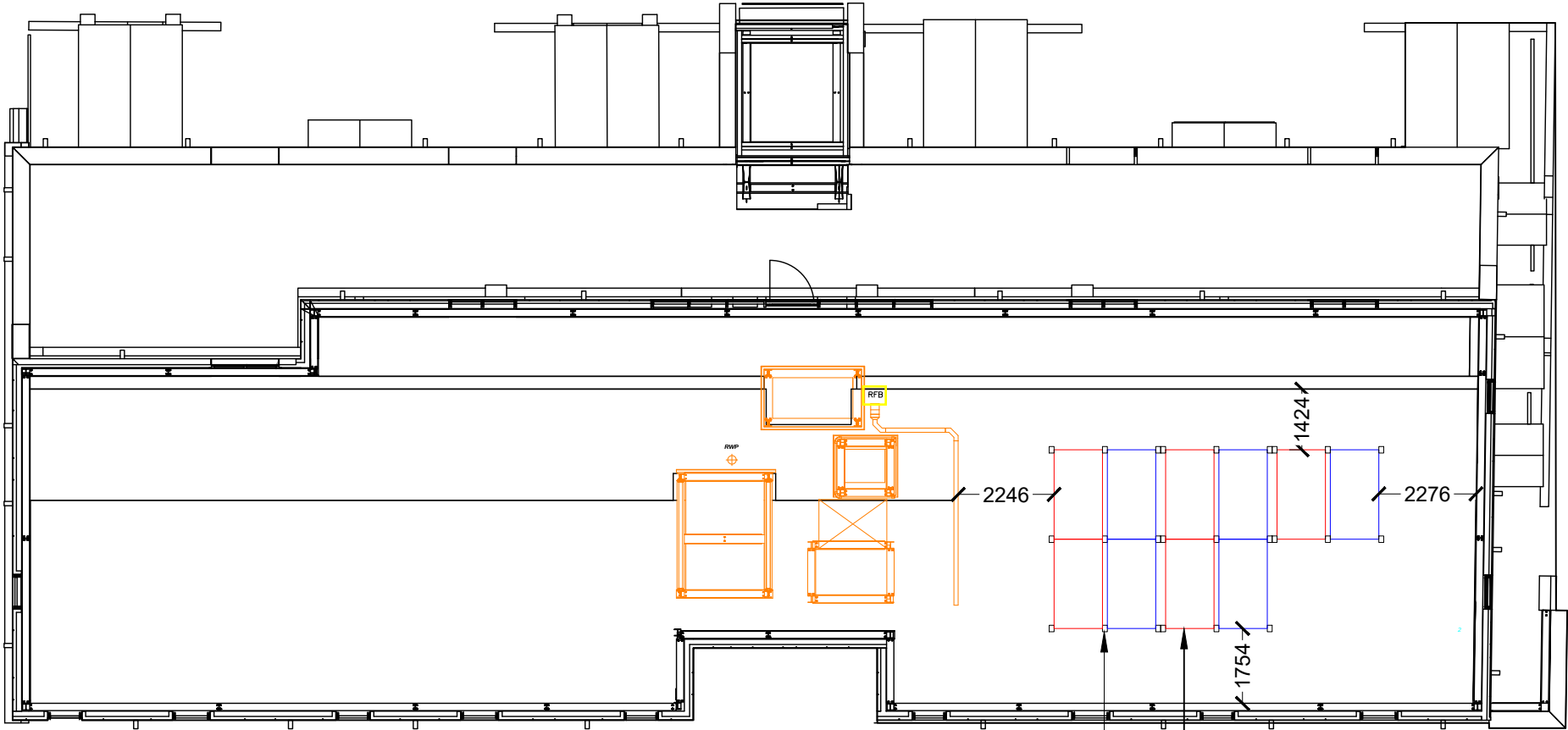
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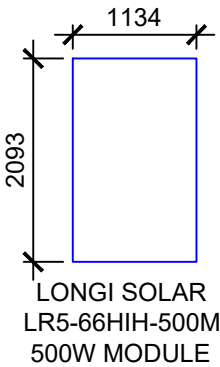
SHEET NAME
LAYOUT PLAN
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ANSI B 279 X 432
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A.01



ORIENTATION:- 90° & 270°
INCLINATION:- 10°

(10) LONGI SOLAR LR5-66HIH-500M
500W MODULES

(24) RENUSOL (FS10-EW)
ATTACHMENT (TYP.)





1

LAYOUT PLAN

SCALE:- 1:150

SYSTEM SIZE 5.00KW DC STC & 5.00KW AC (10) LONGI SOLAR LR5-66HIH-500M 500W MODULES	
1*5 PANELS CONNECTED IN STRING TO MPPT #1	INVERTER
1*5 PANELS CONNECTED IN STRING TO MPPT #2	

LEGENDS

EAST FACING MODULE

WEST FACING MODULE



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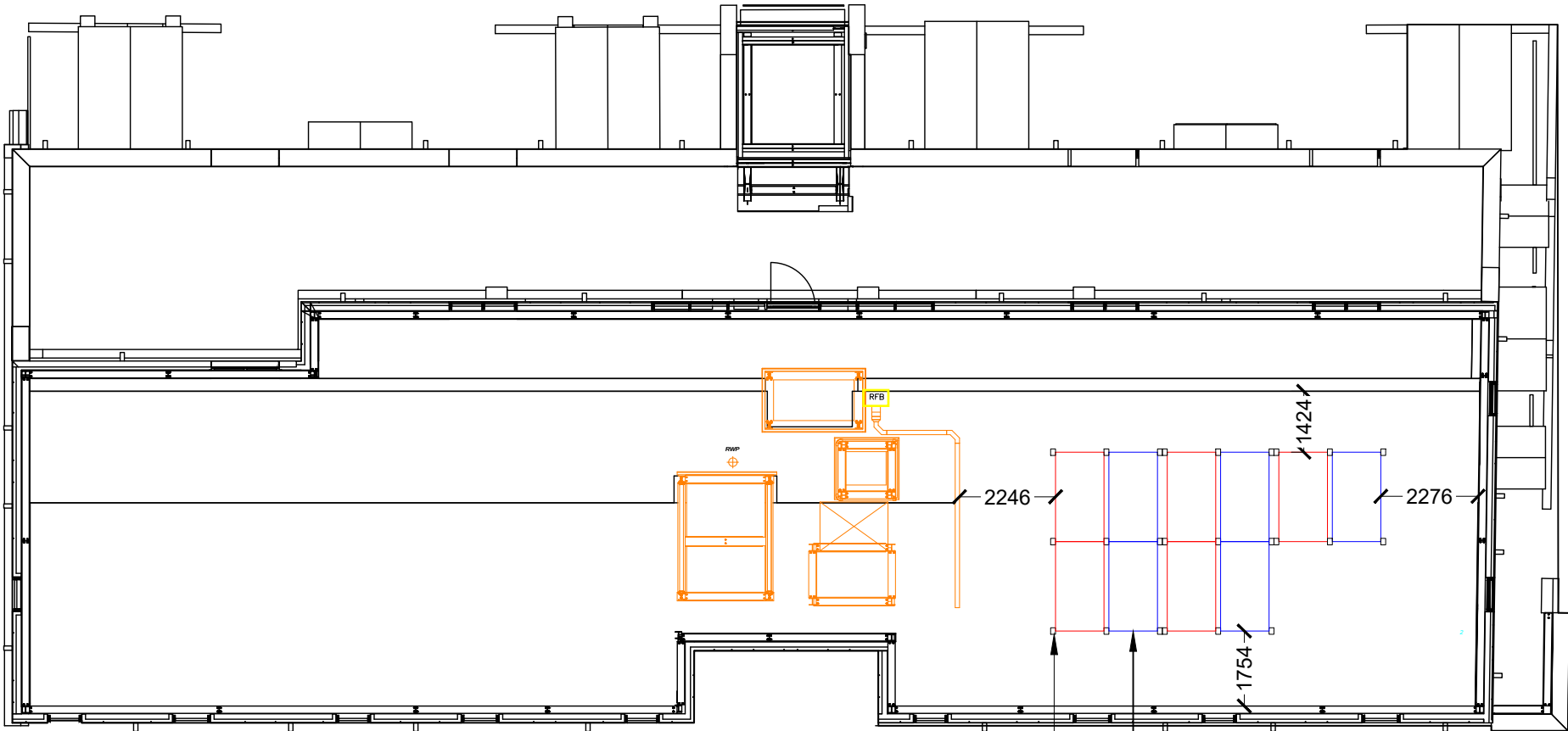
STRING LAYOUT

SHEET SIZE

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279 X 432

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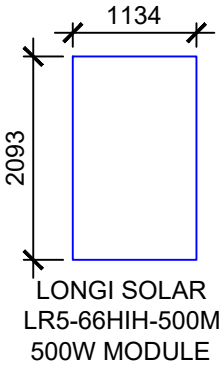
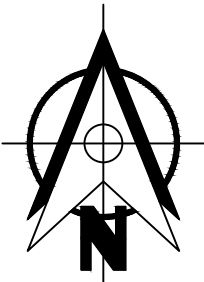
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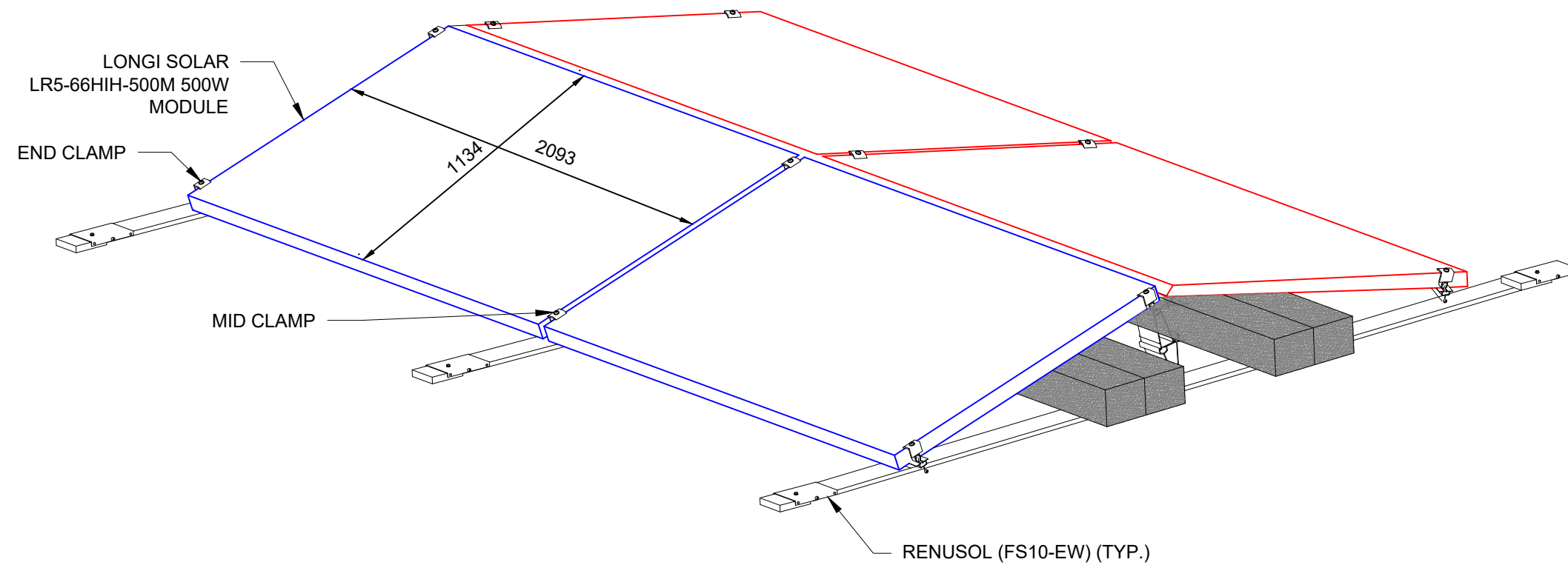


ORIENTATION:- 90° & 270°
INCLINATION:- 10°

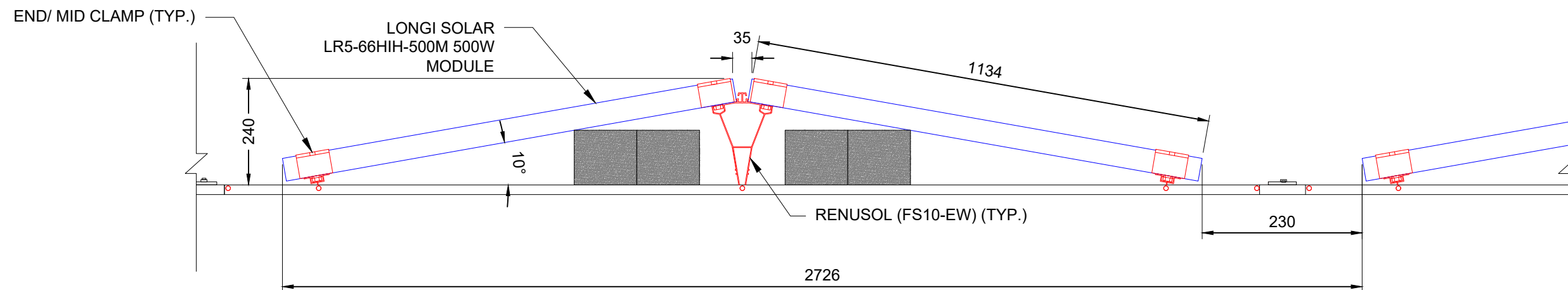
(10) LONGI SOLAR LR5-66HIH-500M
500W MODULES

(24) RENUSOL (FS10-EW) ATTACHMENT (TYP.)





1 ISOMETRIC VIEW
SCALE:- NTS



1 STRING PLAN
SCALE:- NTS



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DISPENSARY

SHEET NAME

FRAMING
LAYOUT

SHEET SIZE

ANSI B
279 X 432

SHEET NUMBER

S.01

SYSTEM SIZE 5.00KW DC STC & 5.00KW AC (10) LONGI SOLAR LR5-66HIH-500M 500W MODULES	SYSTEM SIZE	ORIENT.	ARRAY INCLINATION
1*5 PANELS CONNECTED IN STRING TO MPPT #1	2.50 KW	270° & 90°	10°
1*5 PANELS CONNECTED IN STRING TO MPPT #2	2.50 KW	270° & 90°	10°

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	LONGI SOLAR LR5-66HIH-500M
VMP	38.38 V
IMP	13.03 A
VOC	45.55 V
ISC	13.90 A
MODULE DIMENSION	2093 (L) x 1134 (W) x 35 (D) (in mm)
MODULE EFFICIENCY (%)	21.1

NOTES	
1	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTS AND SPECIFICATIONS.
2	INFORMATION AND SETTING OUT ON THIS DRAWING IS BASED LARGELY ON INFORMATION TAKEN FROM CAD DRAWINGS PREPARED BY OTHERS AND GIVEN IN GOOD FAITH. NO RESPONSIBILITY CAN BE ACCEPTED FOR ERRORS RESULTING FROM INACCURACIES IN THESE ORIGINAL DRAWINGS
	LAYOUT SUBJECT TO CHANGE DEPENDANT ON SITE CONDITIONS.

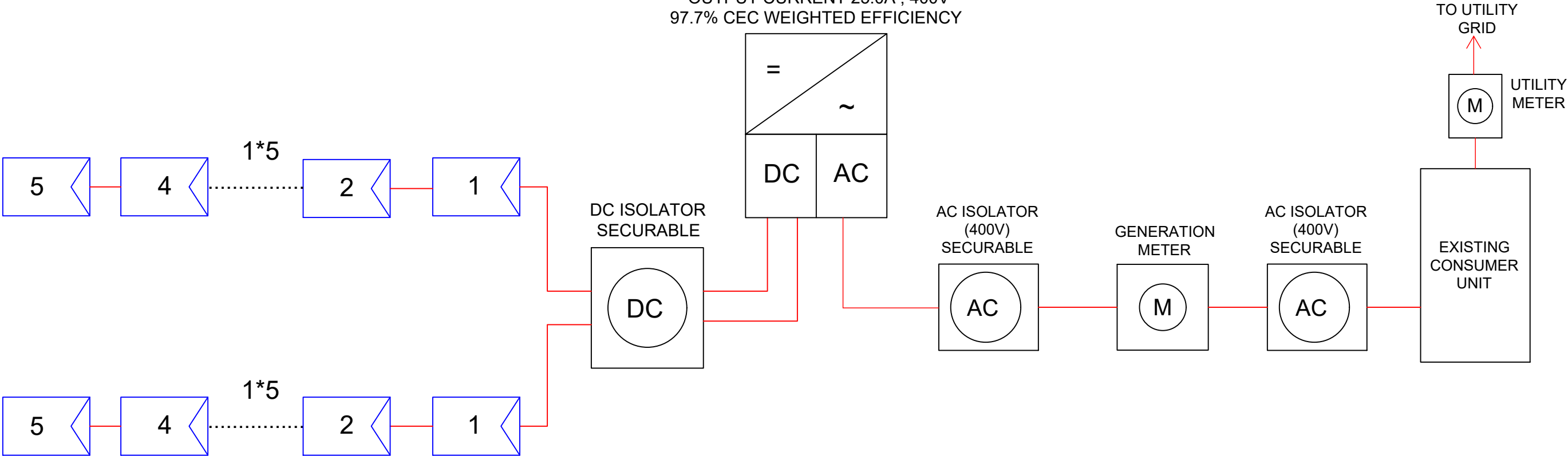


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OUTPUT DETAILS INVERTER	
RATED MAX. POWER- POINT CURRENT (Imp)	26.06 A
RATED MAX. POWER-POINT VOLTAGE (Vmp)	191.90 V
MAX. SYSTEM-VOLTAGE (Voc)	227.75V
SHORT CIRCUIT-CURRENT (Isc)	27.80 A

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	S6-GR1P5K
MAX. DC INPUT POWER	7.5 KW
MAX. APPARENT OUTPUT POWER	5 KW
MAX. OUTPUT CURRENT	25.0 A

(N) INVERTER:
GINLONG (SOLIS) S6-GR1P5K
OUTPUT CURRENT 25.0A , 400V
97.7% CEC WEIGHTED EFFICIENCY



1 ELECTRICAL LINE DIAGRAM & CALCULATION

SCALE:- NTS

PROJECT NAME

DISPENSARY

SHEET NAME

ELECTRICAL
LINE DIAGRAM

SHEET SIZE

ANSI B
279 X 432

SHEET NUMBER

E.00

Hi-MO 5m
(G2)

LR5-66HIH
490~510M

- Based on M10-182mm wafer, best choice for ultra-large power plants
- Advanced module technology delivers superior module efficiency
 - M10 Gallium-doped Wafer
 - Integrated Segmented Ribbons
 - 9-busbar Half-cut Cell
- Excellent outdoor power generation performance
- High module quality ensures long-term reliability

12 12-year Warranty for Materials and Processing

25 25-year Warranty for Extra Linear Power Output

Complete System and Product Certifications

IEC 61215, IEC 61730, UL 61730
ISO9001:2015: ISO Quality Management System
ISO14001: 2015: ISO Environment Management System
ISO45001: 2018: Occupational Health and Safety
TS62941: Guideline for module design qualification and type approval

LONGI



Hi-MO 5m

21.5%
MAX MODULE
EFFICIENCY

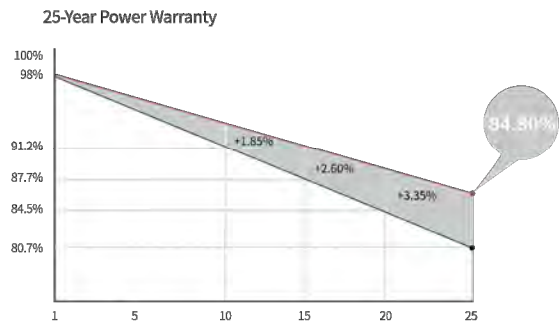
0~3%
POWER
TOLERANCE

<2%
FIRST YEAR
POWER DEGRADATION

0.55%
YEAR 2-25
POWER DEGRADATION

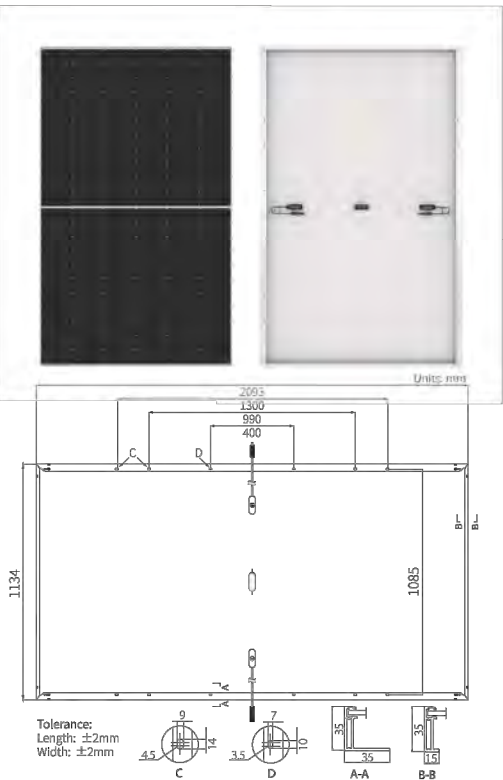
HALF-CELL
Lower operating temperature

Additional Value



Mechanical Parameters

Cell Orientation	132 (6×22)
Junction Box	IP68, three diodes
Output Cable	4mm ² , +400, -200mm length can be customized
Connector	LONGI LR5 or MC4 EVO2
Glass	Single glass, 3.2mm coated tempered glass
Frame	Anodized aluminum alloy frame
Weight	25.3kg
Dimension	2093×1134×35mm
Packaging	31pcs per pallet / 155pcs per 20' GP / 682pcs per 40' HC



Electrical Characteristics

		STC: AM1.5 1000W/m ² 25°C		NOCT: AM1.5 800W/m ² 20°C 1m/s		Test uncertainty for Pmax: ±3%			
Module Type		LR5-66HIH-490M	LR5-66HIH-495M	LR5-66HIH-500M	LR5-66HIH-505M	LR5-66HIH-510M			
Testing Condition		STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)		490	366.3	495	370.0	500	373.7	505	377.5
Open Circuit Voltage (Voc/V)		45.25	42.55	45.40	42.69	45.55	42.83	45.70	42.97
Short Circuit Current (Isc/A)		13.74	11.11	13.82	11.17	13.90	11.24	13.97	11.30
Voltage at Maximum Power (Vmp/V)		38.08	35.37	38.23	35.51	38.38	35.65	38.53	35.79
Current at Maximum Power (Imp/A)		12.87	10.35	12.95	10.42	13.03	10.48	13.11	10.55
Module Efficiency(%)		20.6		20.9		21.1		21.3	

Operating Parameters

Operational Temperature	-40°C ~ +85°C
Power Output Tolerance	0~3%
Voc and Isc Tolerance	±3%
Maximum System Voltage	DC1500V (IEC/UL)
Maximum Series Fuse Rating	25A
Nominal Operating Cell Temperature	45±2°C
Protection Class	Class II
Fire Rating	UL type 1 or 2 IEC Class C

Mechanical Loading

Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

Temperature Ratings (STC)

Temperature Coefficient of Isc	+0.050%/°C
Temperature Coefficient of Voc	-0.265%/°C
Temperature Coefficient of Pmax	-0.340%/°C

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Specifications included in this datasheet
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(20220410PreliminaryV01) G2

LONGI



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DESIGN BY DR

CHECKED BY JD

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DISPENSARY

SHEET NAME

SPECIFICATION
SHEET

SHEET SIZE

ANSI B
279 X 432

SHEET NUMBER

D.00



S6-GR1P(2.5-6)K

Solis Single Phase Inverters

>> Models:

- S6-GR1P2.5K S6-GR1P4.6K
- S6-GR1P3K S6-GR1P5K
- S6-GR1P3.6K S6-GR1P6K
- S6-GR1P4K



360° View

Features:

- Max. efficiency 97.7%
 - String current up to **14A**
 - Super high frequency switching technology
 - Wide voltage range and low startup voltage
 - 2 MPPT design with precise MPPT algorithm
- Integrated Export Power Manager (EPM)
 - AFCI protection, proactively reduces fire risk
 - Compact and lightweight
 - Friendly and adaptable connection to the grid

DATASHEET	S6-GR1P(2.5-6)K						
Models	2.5K	3K	3.6K	4K	4.6K	5K	6K
Input DC							
Recommended max. PV power	3.75 kW	4.5 kW	5.4 kW	6 kW	6.9 kW	7.5 kW	9 kW
Max. input voltage	550 V			600 V			
Rated voltage	250 V			330 V			
Start-up voltage	60 V			120 V			
MPPT voltage range	50-450 V			90-520 V			
Max. input current				14 A / 14 A			
Max. short circuit current				22 A / 22 A			
MPPT number/Max. input strings number				2/2			
Output AC							
Rated output power	2.5 kW	3 kW	3.6 kW	4 kW	4.6 kW	5 kW	6 kW
Max. apparent output power	2.8 kVA	3.3 kVA	4 kVA	4.4 kVA	5 kVA	5 kVA	6 kVA
Max. output power	2.8 kW	3.3 kW	4 kW	4.4 kW	5 kW	5 kW	6 kW
Rated grid voltage	1/N/PE, 220 V / 230 V						
Rated grid frequency	50 Hz / 60 Hz						
Rated grid output current	11.4 A / 10.9 A	13.6 A / 13.0 A	16.0 A / 15.7 A	18.2 A / 17.4 A	20.9 A / 20.0 A	22.7 A / 21.7 A	27.3 A
Max. output current	13.3 A	15.7 A	16.0 A	21.0 A	23.8 A	25.0 A	27.3 A
Power factor	>0.99 (0.8 leading - 0.8 lagging)						
THDi	<3%						
Efficiency							
Max. efficiency	97.3%	97.3%		97.6%		97.7%	
EU efficiency	96.5%	96.6%		97.1%		97.1%	
Protection							
DC reverse-polarity protection	Yes						
Short circuit protection	Yes						
Output over current protection	Yes						
Surge protection	Yes						
Grid monitoring	Yes						
Anti-islanding protection	Yes						
Temperature protection	Yes						
Integrated AFCI (DC arc-fault circuit protection)	Yes ⁽¹⁾						
Integrated DC switch	Optional						
General Data							
Dimensions (W*H*D)	310*543*160 mm						
Weight	11 kg	11.2 kg				12 kg	
Topology	Transformerless						
Self-consumption (night)	<1 W						
Operating ambient temperature range	-25 ~ +60°C						
Relative humidity	0-100%						
Ingress protection	IP66						
Cooling concept	Natural convection						
Max. operation altitude	4000 m						
Grid connection standard	IEC 60909-1, VDE-AR-N 4105, VDE 0174, IEC 60849-1, VDE 0120 / ULT, IEC 15 / VDE 2019, RD 1699 / RD 244 / UNE 200006 / UNE 200007-1, CEI 0-21, C10V11, NRS 097-2-1, EBS 2018.2, IEC 62115, IEC 61127, IEC 60068, IEC 61683, EN 50530, MEA, PEA						
Safety/EMC standard	IEC/EN 62109-1/-2, IEC/EN 61000-6-2/-3						
Features							
DC connection	MC4 connection						
AC connection	Quick connection plug						
Display	LCD						
Communication	RS485, Optional: WiFi, GPRS						

(1) Activation required. (2) G-98 for 2.5K-3.6K

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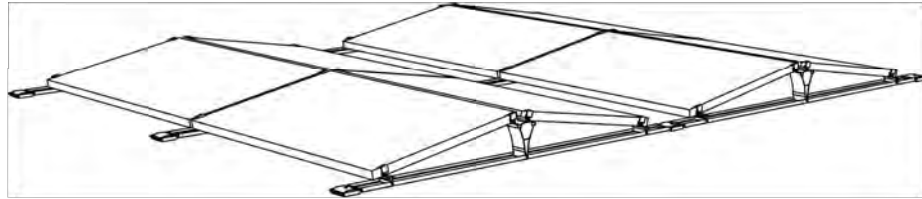
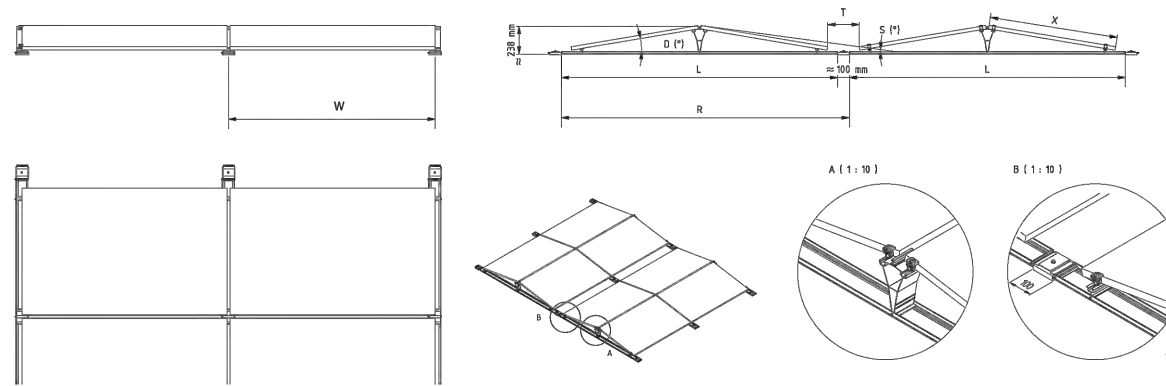
PROJECT NAME

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SHEET NAME
SPECIFICATION
SHEET

SHEET SIZE
ANSI B
279 X 432

SHEET NUMBER
D.01



System Datasheet

FS10-EW / FS10-EW XL

General	
System	Ballasted PV-mounting system
Content	Ground rails, rail connector, building protection mat, low post, high post, clamps
System warranty	10 years
Application area	Flat roof on industrial, agricultural (except hydrogen sulfide exposition) and residential buildings
Roof covering	Bitumen, concrete, foil, gravel
Roof slope	max. 5° without additional measures

System properties	
System orientation	East-West
Module tilt	10°
System weight approx.	1,15 kg/m²plus ballast (project specific)
Weight PV-module included approx.:	11,8 kg/m²plus ballast (project specific)
Friction coefficient	$\mu = 0,5$ is to be determined and ensured upon installation surface.
Material	Aluminum, stainless steel, rubber granulate
Minimum edge distance	0,6 m
Max. Wind Dynamic Pressure	$q_p = 1,5 \text{ kN/m}^2$ (with simultaneously acting snow load of $s_k = 1,5 \text{ kN/m}^2$)
Max. Wind Dynamic Pressure	$q_p = 1,0 \text{ kN/m}^2$ (with simultaneously acting snow load of $s_k = 2,5 \text{ kN/m}^2$)

Modules	
Type	Suitable for standard 60/72 cell panels. Approval for panel corner clamping is to be obtained.
Module width:	FS10-EW: 950-1.052 mm / FS10-EW XL: 1053-1.168 mm
Module guidance	Horizontal/Landscape

Certifications	
Wind loads	Determined in wind tunnel tests by Ruscheweyh Consult GmbH
PV layout	Provided by Renusol (www.pv-configurator.com)
Ballast plan	Provided by Renusol (www.pv-configurator.com)

Services	
PV layout	Provided by Renusol (www.pv-configurator.com)
Ballast plan	Provided by Renusol (www.pv-configurator.com)

System FS10-EW XL		
Ground rail	R500499	
Rail length	L:	2362 mm
Row spacing	R:	2462 mm
Module width	X ₁ :	Min: 1053 mm
	X ₂ :	Max: 1168 mm
Passageway	T(X ₁):	Min: 355 mm
	T(X ₂):	Max: 125 mm
System width	W:	Module length +24mm
Module inclination	D:	9°
Shading angle	S:	≈ 7,0° - 9,0°

System FS10-EW		
Ground rail	R500500	
Rail length	L:	2260 mm
Row spacing	R:	2360 mm
Module width	X ₁ :	Min: 950 mm
	X ₂ :	Max: 1052 mm
Passageway	T(X ₁):	Min: 455 mm
	T(X ₂):	Max: 255 mm
System width	W:	Module length +24mm
Module inclination	D:	10°
Shading angle	S:	≈ 6,7° - 7,9°

System FS10-EW		
Ground rail	R500407	
Rail length	L:	2060 mm
Row spacing	R:	2160 mm
Module width	X ₁ :	Min: 950 mm
	X ₂ :	Max: 1052 mm
Passageway	T(X ₁):	Min: 255 mm
	T(X ₂):	Max: 55 mm
System width	W:	Module length +24mm
Module inclination	D:	10°
Shading angle	S:	≈ 7,8° - 9,3°

System FS10-EW		
Ground rail	R500501	
Rail length	L:	1989 mm
Row spacing	R:	2090 mm
Module width	X ₁ :	Min: 950 mm
	X ₂ :	Max: 1020 mm
Passageway	T(X ₁):	Min: 185 mm
	T(X ₂):	Max: 45 mm
System width	W:	Module length +24mm
Module inclination	D:	10°
Shading angle	S:	≈ 9,0° - 9,5°

FS10-EW 09 | 2021
EN | Renusol System Datasheet
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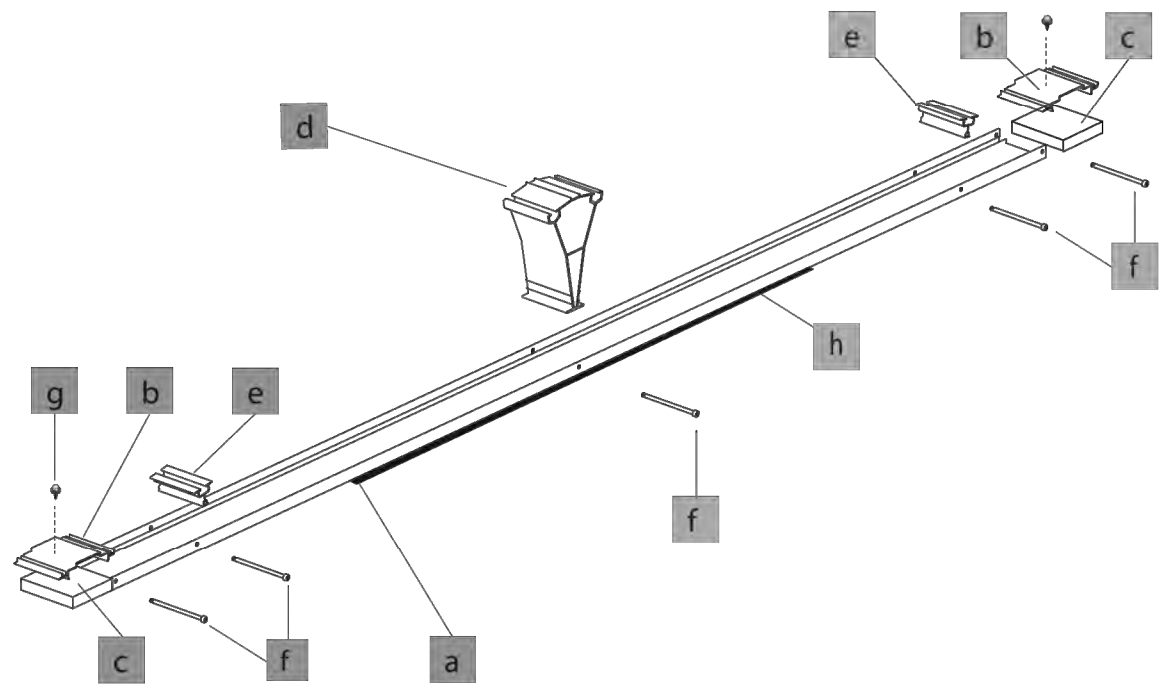
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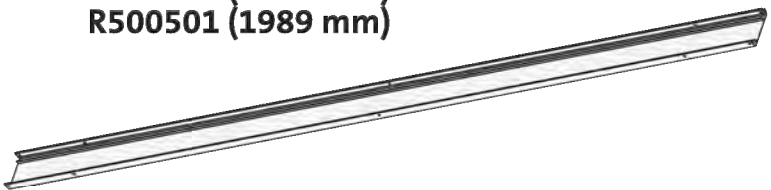
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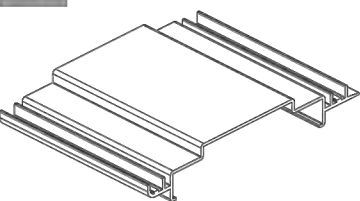
D.02



a R500499 (2362 mm) - FS10-EW XL
R500500 (2260 mm)
R500407 (2060 mm)
R500501 (1989 mm)



b R500404

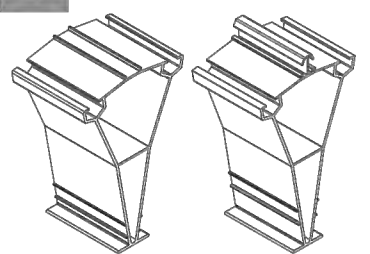


c R500410/R500411

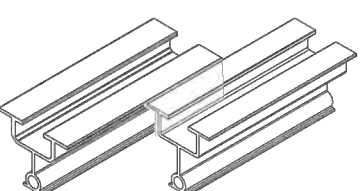


R500410: Bituminöse Abdichtung /Bituminous sealing
R500411: Folienabdichtung / Foil sealing

d R500520 - FS10-EW
R500423 - FS10-EW XL



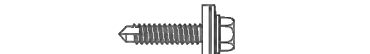
e R500420 - FS10-EW
R500419 - FS10-EW XL



f R900314



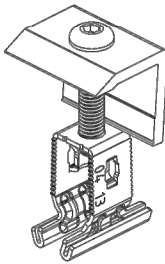
g R900229



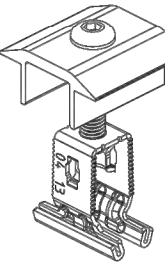
h R500412



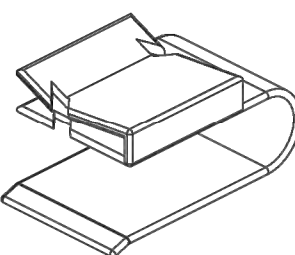
R420081



R420082



R900260 (optional)



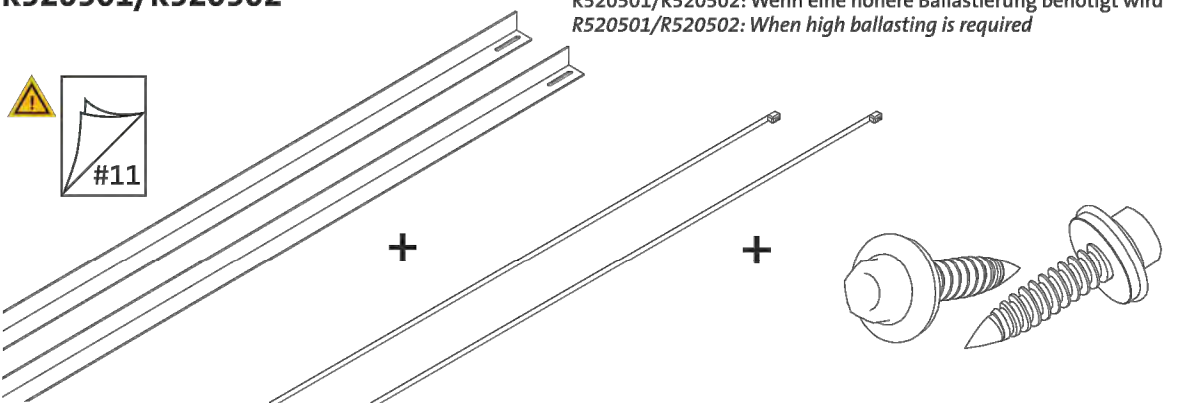
R900035 (optional)



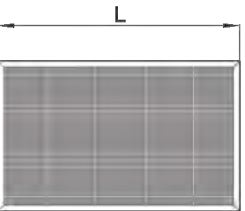
R520501/R520502



R520501/R520502: Wenn eine höhere Ballastierung benötigt wird
R520501/R520502: When high ballasting is required



Modullänge L / Modul length L	Artikel No.
1770 mm	R520501
2120 mm	R520502



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279 X 432

SHEET NUMBER
D.03

Project Overview

PV System

Grid-connected PV System

Climate Data	West Pennines Wales / West Pennines England (SAP 2012), GBR (-)
Values source	SAP 2012
PV Generator Output	5 kWp
PV Generator Surface	23.5 m ²
Number of PV Modules	10
Number of Inverters	1

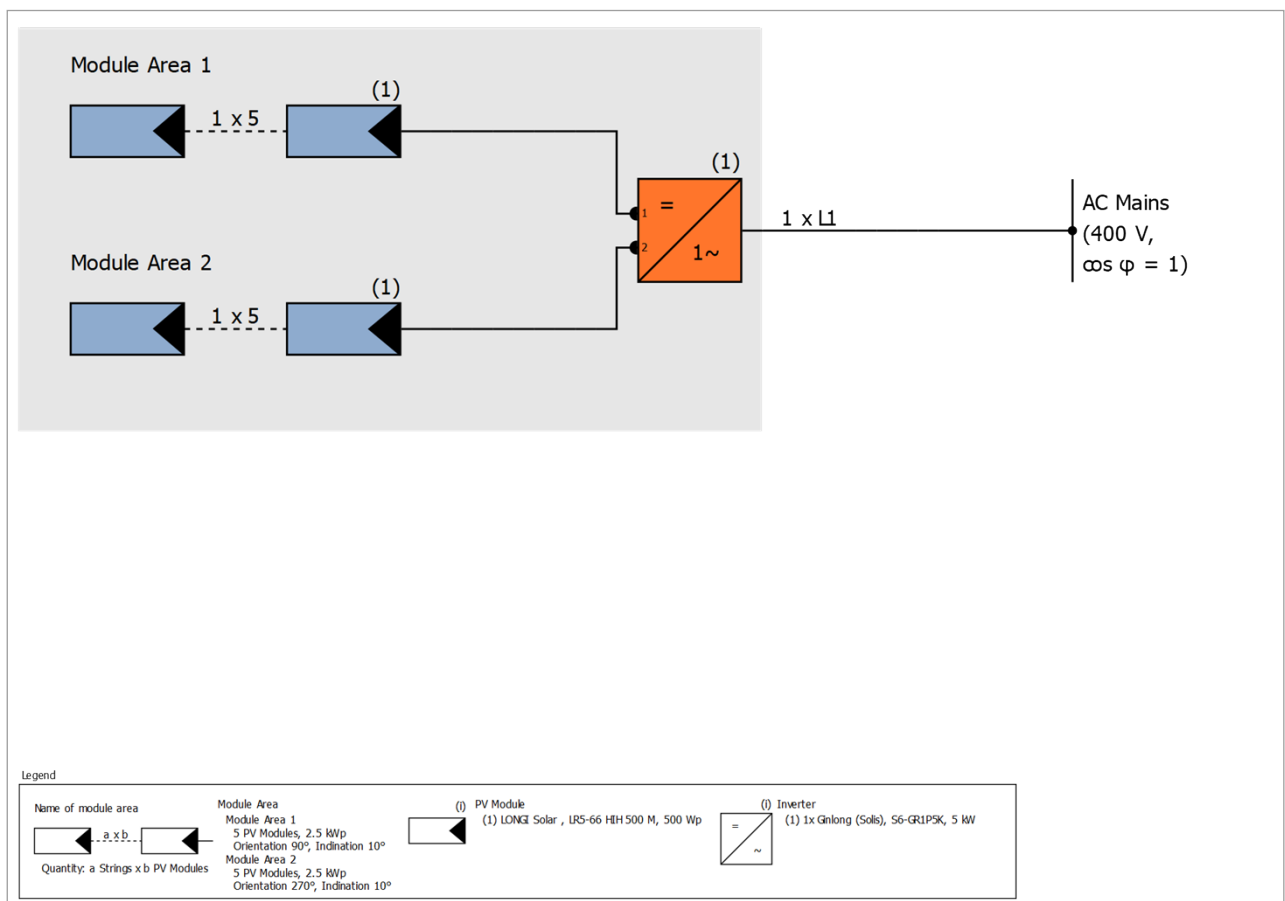


Figure: Schematic diagram

Production Forecast

Production Forecast

PV Generator Output	5.00 kWp
Spec. Annual Yield	810.85 kWh/kWp
Performance Ratio (PR)	91.22 %
Grid Feed-in	4,059 kWh/Year
Grid Feed-in in the first year (incl. module degradation)	3,966 kWh/Year
Standby Consumption (Inverter)	5 kWh/Year
CO ₂ Emissions avoided	1,905 kg / year

Financial Analysis

Your Gain

Total investment costs	6,000.00 £
Internal Rate of Return (IRR)	0.00 %
Amortization Period	More than 25 Years
Electricity Production Costs	0.0945 £/kWh
Energy Balance/Feed-in Concept	Full Feed-in

The results have been calculated with a mathematical model calculation from Valentin Software GmbH (PV*SOL algorithms). The actual yields from the solar power system may differ as a result of weather variations, the efficiency of the modules and inverter, and other factors.

Set-up of the System

Overview

System Data

Type of System	Grid-connected PV System
----------------	--------------------------

Climate Data

Location	West Pennines Wales / West Pennines England (SAP 2012), GBR (-)
Values source	SAP 2012
Resolution of the data	1 h
Simulation models used:	
- Diffuse Irradiation onto Horizontal Plane	Hofmann
- Irradiance onto tilted surface	Hay & Davies

Module Areas

1. Module Area - Module Area 1

PV Generator, 1. Module Area - Module Area 1

Name	Module Area 1
PV Modules	5 x LR5-66 HIH 500 M (v1)
Manufacturer	LONGI Solar
Inclination	10 °
Orientation	East 90 °
Installation Type	Mounted - Roof
PV Generator Surface	11.7 m²

2. Module Area - Module Area 2

PV Generator, 2. Module Area - Module Area 2

Name	Module Area 2
PV Modules	5 x LR5-66 HIH 500 M (v1)
Manufacturer	LONGI Solar
Inclination	10 °
Orientation	West 270 °
Installation Type	Mounted - Roof
PV Generator Surface	11.7 m²

Inverter configuration

Configuration 1

Module Areas	Module Area 1 + Module Area 2
Inverter 1	
Model	S6-GR1P5K (v1)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	100 %
Configuration	MPP 1: 1 x 5
	MPP 2: 1 x 5

AC Mains

AC Mains

Number of Phases	3
Mains voltage between phase and neutral	400 V
Displacement Power Factor (cos phi)	+/- 1

Simulation Results

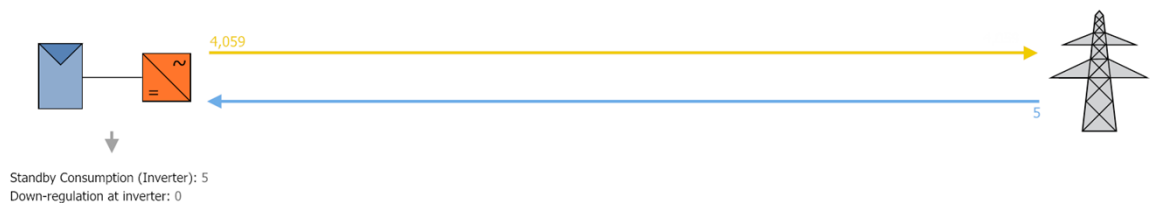
Results Total System

PV System

PV Generator Output	5.00 kWp
Spec. Annual Yield	810.85 kWh/kWp
Performance Ratio (PR)	91.22 %
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Energy Flow Graph

Project: Dispensary



All values in kWh
Small deviations in the totals can occur due to rounding
created with PV*SOL

Figure: Energy flow

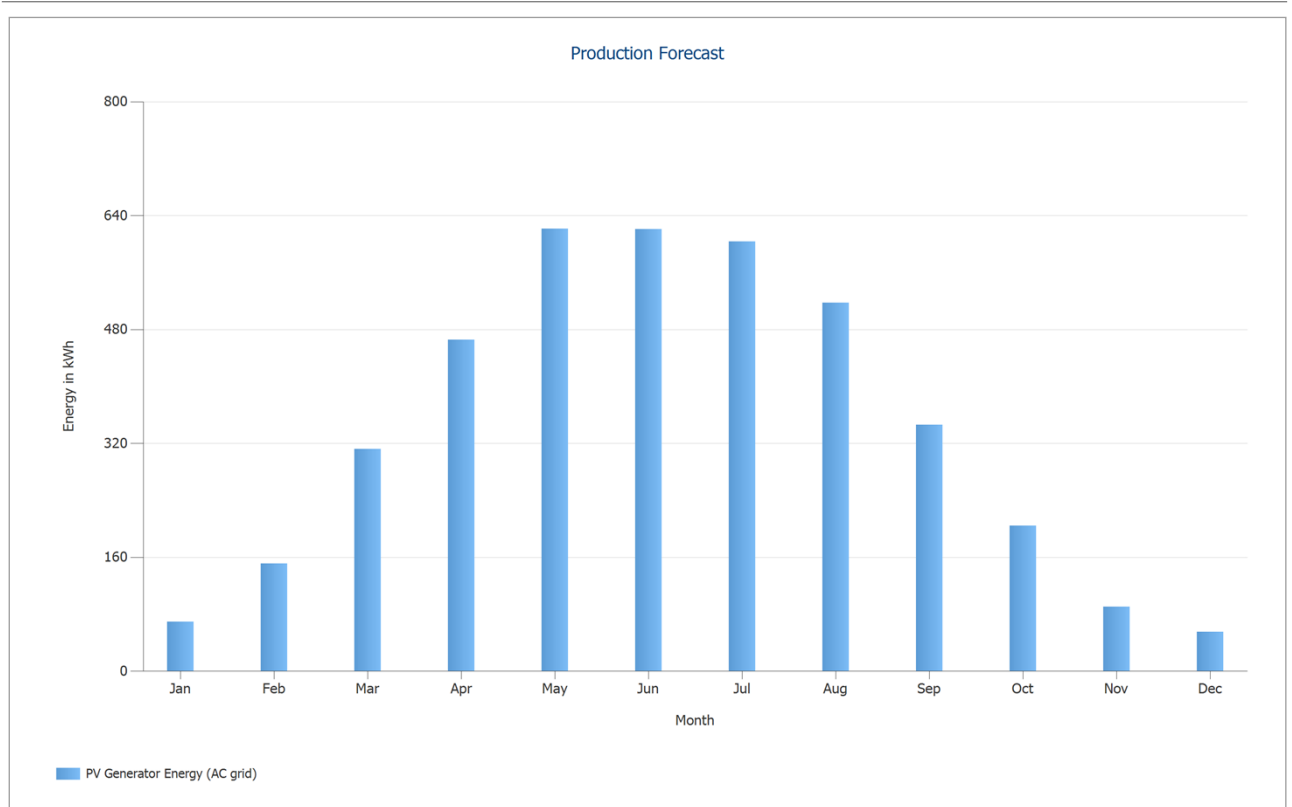


Figure: Production Forecast

Plans and parts list

Circuit Diagram

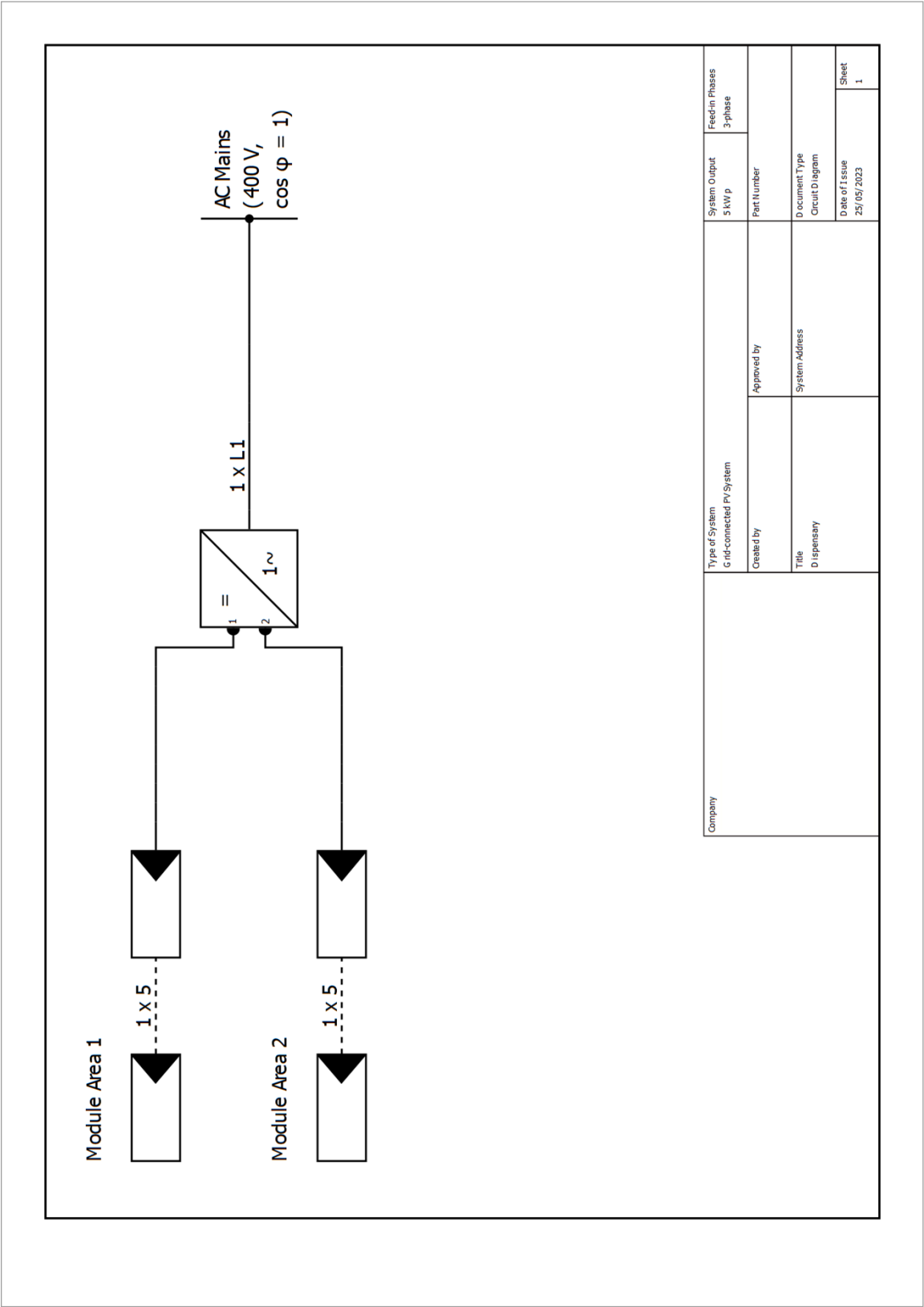


Figure: Circuit Diagram

Parts list

Parts list

#	Type	Item number	Manufacturer	Name	Quantity	Unit
1	PV Module		LONGI Solar	LR5-66 HIH 500 M	10	Piece
2	Inverter		Ginlong (Solis)	S6-GR1P5K	1	Piece