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LAMPIRAN

Lampiran 1 Perbandingan keluaran PV

Tabel 12 Perbandingan keluaran PV

WITA	JINKO555WP	ET540WP	ET450WP	LONGI540WP	LONGI455WP
1:00 AM	0	0	0	0	0
2:00 AM	0	0	0	0	0
3:00 AM	0	0	0	0	0
4:00 AM	0	0	0	0	0
5:00 AM	0	0	0	0	0
6:00 AM	0,002002121	0,005216481	0,001623406	0,001948082	0,00164144
7:00 AM	0,021790102	0,024783969	0,017618889	0,021146109	0,017817555
8:00 AM	0,029886104	0,032593072	0,023986719	0,028801375	0,024267826
9:00 AM	0,101915177	0,102244317	0,080649323	0,096919287	0,081663474
10:00 AM	0,168383449	0,165223695	0,131595328	0,158262582	0,133350879
11:00 AM	0,188525167	0,184052257	0,146771886	0,176555982	0,148764763
12:00 PM	0,197353012	0,191940736	0,153104996	0,184213949	0,155217309
1:00 PM	0,179989946	0,175525187	0,139871322	0,168273901	0,141786342
2:00 PM	0,14504781	0,142745376	0,113416338	0,136395414	0,114925765
3:00 PM	0,08601938	0,086501074	0,067844848	0,081547986	0,068711729
4:00 PM	0,03893789	0,0411713	0,030969975	0,037206415	0,03134985
5:00 PM	0,013889452	0,016804392	0,011089858	0,013319961	0,0112233
6:00 PM	0	0	0	0	0
7:00 PM	0	0	0	0	0
8:00 PM	0	0	0	0	0
9:00 PM	0	0	0	0	0
10:00 PM	0	0	0	0	0
11:00 PM	0	0	0	0	0
12:00 AM	0	0	0	0	0

Lampiran 2 Algoritme MOORA untuk peringkat PV

```
alternatif=['pvA','pvB','pvC','pvD','pvE','pvF']
kriteria=['power','type','harga','efficiency']
tipe=['benefit','benefit','cost','benefit']
bobot=[485.05,1,0,100]
alternatifkriteria=[[450,1,175.50,20.6],[445,1,217.59,20.5],[540,1,236.14,20.9],[5
40,1,309.26,20.5],[555,1,294.22,21.48],[320,1,259.840,16.01]]
pembagi = []
for i in range(len(kriteria)):
    pembagi.append(0)
    for j in range(len(alternatif)):
        pembagi[i] = pembagi[i] + (alternatifkriteria[j][i] * alternatifkriteria[j][i])
    pembagi[i] = pembagi[i] ** (1/2.0)
print(pembagi, "<--Matrix Divider")
normalisasi = []
for i in range(len(alternatif)):
    normalisasi.append([])
    for j in range(len(kriteria)):
        normalisasi[i].append(0)
        normalisasi[i][j] = alternatifkriteria[i][j] / pembagi[j]
print(normalisasi, "<--Matriks Normalization")
optimasi = []
for i in range(len(alternatif)):
    optimasi.append(0)
    for j in range(len(kriteria)):
        if tipe[j] == "cost":
            optimasi[i] = optimasi[i] - (normalisasi[i][j] * bobot[j])
        elif tipe[j] == "benefit":
            optimasi[i] = optimasi[i] + (normalisasi[i][j] * bobot[j])
```

```
print(optimasi)
alternatifrangking = []
optimasirangking = []
for i in range(len(alternatif)):
    optimasirangking.append(optimasi[i])
    alternatifrangking.append(alternatif[i])
for i in range(len(alternatif)):
    for j in range(len(alternatif)):
        if j > i:
            if optimasirangking[j] > optimasirangking[i]:
                tmpoptimasi = optimasirangking[i]
                tmpalternatif = alternatifrangking[i]
                optimasirangking[i] = optimasirangking[j]
                alternatifrangking[i] = alternatifrangking[j]
                optimasirangking[j] = tmpoptimasi
                alternatifrangking[j] = tmpalternatif
print(alternatifrangking, "<--alternatif rangking")
```

Lampiran 3 Algoritme MOORA untuk peringkat baterai

```
alternatif=['batteryA','batteryB','batteryC','batteryD','batteryE','batteryF']
kriteria=['power','type','harga','lifespan']
tipe=['benefit','benefit','cost','benefit']
bobot=[243.57,1,0,100]
alternatifkriteria=[[78,40,2902.50,10],[600,2,521.25,25],[50,48,1123.20,8.2],[128,
25.6,237.69,10],[100,12,248.93,12],[66.67,51,1873.53,15]]
pembagi=[]

for i in range(len(kriteria)):
    pembagi.append(0)
    for j in range(len(alternatif)):
        pembagi[i]=pembagi[i]+(alternatifkriteria[j][i]*alternatifkriteria[j][i])
    pembagi[i]=pembagi[i]**(1/2.0)
print(pembagi,"<--Matrix Divider")

normalisasi=[]

for i in range(len(alternatif)):
    normalisasi.append([])
    for j in range(len(kriteria)):
        normalisasi[i].append(0)
        normalisasi[i][j]=alternatifkriteria[i][j]/pembagi[j]

print(normalisasi,"<--Matrix Normalization")

optimasi=[]
for i in range(len(alternatif)):
    optimasi.append(0)
```

```
    for j in range(len(kriteria)):
        if (tipe[j]=="cost"):
            optimasi[i]=optimasi[i]-(normalisasi[i][j]*bobot[j])
        elif (tipe[j]=="benefit"):
            optimasi[i]=optimasi[i]+(normalisasi[i][j]*bobot[j])
print(optimasi)

alternatifrangking=[]
optimasirangking=[]
for i in range(len(alternatif)):
    optimasirangking.append(optimasi[i])
    alternatifrangking.append(alternatif[i])

for i in range(len(alternatif)):
    for j in range(len(alternatif)):
        if (j>i):
            if (optimasirangking[j]>optimasirangking[i]):
                tmpoptimasi=optimasirangking[i]
                tmpalternatif=alternatifrangking[i]
                optimasirangking[i]=optimasirangking[j]
                alternatifrangking[i]=alternatifrangking[j]
                optimasirangking[j]=tmpoptimasi
                alternatifrangking[j]=tmpalternatif
print(alternatifrangking,"<--alternatif rangking")
```

Lampiran 4 Algoritme PSO pembangkit sistem hibrida

```
from functools import total_ordering
import numpy as np
from pyswarm import pso

# Inisialisasi seed acak untuk hasil yang konsisten
np.random.seed(42)

# Konstanta
fuel_cost = 2
battery_cost = 521.25
pv_cost = 295.22
battery_output = 1.2  # kWh
pv_output_perhour = np.array([0, 0, 0, 0, 0, 0.002002121, 0.021790102,
0.029886104, 0.101915177, 0.168383449,
                              0.188525167, 0.197353012, 0.179989946, 0.14504781,
0.08601938, 0.03893789, 0.013889452,
                              0, 0, 0, 0, 0, 0, 0])  # kWh
load_data_perhour = np.array([19.55, 19.07, 17.28, 16.21, 16.19, 16.11, 16.17,
17.66, 20.00, 22.52, 23.37, 23.34,
                              23.85, 24.41, 23.74, 22.90, 20.77, 18.92, 20.75, 20.40, 20.56,
20.77, 20.47, 20.03])  # kWh
generator_output = 110  # kVa
inverter_output = 100  # kW
emissions = 860.64  # CO2 emissions in g/kWh

def objective_function(x):
    # x[0]: Jumlah baterai
    # x[1]: Jumlah generator
    # x[2]: Jumlah inverter
```

```
    # x[3:]: Jumlah panel surya per jam
    total_battery_output = x[0] * battery_output
    total_pv_output = np.sum(pv_output_perhour * x[3:])
    total_load = np.sum(load_data_perhour)
    excess_power = generator_output - total_load + total_battery_output - 
total_pv_output
    if excess_power < 0:
        total_fuel_cost = fuel_cost * abs(excess_power)
    else:
        total_fuel_cost = 0
    total_cost = x[0] * battery_cost + x[1] * generator_output + x[2] * 
inverter_output + np.sum(x[3:] * pv_cost)
    total_emissions = (total_fuel_cost / fuel_cost) * emissions
    return total_cost + total_emissions


# Batas-batas variabel
lb = [100, 1, 1] + [0] * len(pv_output_perhour)
ub = [200, 2, 2] + [812] * len(pv_output_perhour)


# Menjalankan algoritma PSO
xopt, fopt = pso(objective_function, lb, ub, maxiter=3000)
total = 0
# Menampilkan hasil optimasi
print("Optimized number of batteries: ", int(xopt[0]))
print("Optimal number of generators: ", int(xopt[1]))
print("Optimal number of inverters: ", int(xopt[2]))
for i in range(len(pv_output_perhour)):
    total += int(xopt[i + 3])
print("Optimal number of solar panels: ", total)
```

Lampiran 5 Algoritme GA pembangkit sistem hibrida

```
import numpy as np

from geneticalgorithm import geneticalgorithm as ga


np.random.seed(42)

# Konstanta

FUEL_COST = 2

BATTERY_COST = 521.25

PV_COST = 295.22

BATTERY_OUTPUT = 1.2  # kWh

PV_OUTPUT_PER_HOUR = np.array([0, 0, 0, 0, 0, 0.002002121, 0.021790102,
0.029886104, 0.101915177, 0.168383449, 0.188525167, 0.197353012,
0.179989946, 0.14504781, 0.08601938, 0.03893789, 0.013889452, 0, 0, 0, 0, 0, 0,
0])  # kWh

LOAD_DATA_PER_HOUR = np.array([19.55, 19.07, 17.28, 16.21, 16.19, 16.11,
16.17, 17.66, 20.00, 22.52, 23.37, 23.34, 23.85, 24.41, 23.74, 22.90, 20.77, 18.92,
20.75, 20.40, 20.56, 20.77, 20.47, 20.03])  # kWh

GENERATOR_OUTPUT = 110  # kVa

INVERTER_OUTPUT = 100  # kW

EMISSIONS = 860.64  # CO2 emissions in g/kWh


def objective_function(x):

    total_battery_output = x[0] * BATTERY_OUTPUT

    total_pv_output = np.sum(PV_OUTPUT_PER_HOUR * x[3:])

    total_load = np.sum(LOAD_DATA_PER_HOUR)

    excess_power = GENERATOR_OUTPUT - total_load + total_battery_output -
total_pv_output

    total_fuel_cost = max(0, excess_power) * FUEL_COST

    total_cost = x[0] * BATTERY_COST + x[1] * GENERATOR_OUTPUT +
x[2] * INVERTER_OUTPUT + np.sum(x[3:] * PV_COST)

    total_emissions = (total_fuel_cost / FUEL_COST) * EMISSIONS
```

```
    return total_cost + total_emissions


algorithm_param = {
    'max_num_iteration': 260,
    'population_size': 50,
    'mutation_probability': 0.1,
    'elit_ratio': 0.01,
    'crossover_probability': 0.5,
    'parents_portion': 0.3,
    'crossover_type': 'uniform',
    'max_iteration_without_improv': None
}

varbound = np.array([[100, 200], [1, 1], [1, 1]] + [[0, 812]] *
len(PV_OUTPUT_PER_HOUR))

model = ga(
    function=objective_function,
    dimension=len(varbound),
    variable_type='int',
    variable_boundaries=varbound,
    algorithm_parameters=algorithm_param
)

model.run()

# Menampilkan hasil optimasi
xopt = model.output_dict['variable']
total_pv_panels = int(np.sum(xopt[3:]))
```

```
print("Optimized number of batteries: ", int(xopt[0]))
print("Optimal number of generators: 1")
print("Optimal number of inverters: 1")
print("Optimal number of solar panels: ", total_pv_panels)
```

Lampiran 6 Datasheet PV

ET Solar 450

ELECTRICAL SPECIFICATIONS

Model Type	ET-M672BH450WW ET-M672BH450WB	ET-M672BH445WW ET-M672BH445WB	ET-M672BH440WW ET-M672BH440WB	ET-M672BH435WW ET-M672BH435WB	ET-M672BH430WW ET-M672BH430WB
Peak Power (Pmax)	450W	445W	440W	435W	430W
Module Efficiency	20.6%	20.0%	19.8%	19.6%	19.3%
Maximum Power Voltage (Vmp)	41.1V	41.6V	41.0V	40.8V	40.6V
Maximum Power Current (Imp)	10.98A	10.70A	10.74A	10.67A	10.60A
Open Circuit Voltage (Voc)	49.6V	49.9V	49.6V	49.4V	49.2V
Short Circuit Current (Isc)	11.53A	11.34A	11.33A	11.26A	11.19A
Power Tolerance			0~+3%		
Operating Temperature			- 40 ~ + 85℃		
Maximum System Voltage			DC 1500V		
Nominal Operating Cell Temperature			45±2℃		

ELECTRICAL SPECIFICATIONS (NOCT)

Model Type	ET-M672BH450WW ET-M672BH450WB	ET-M672BH445WW ET-M672BH445WB	ET-M672BH440WW ET-M672BH440WB	ET-M672BH435WW ET-M672BH435WB	ET-M672BH430WW ET-M672BH430WB
Peak Power (Pmax)	333.7W	329.5W	326.0W	322.2W	318.5W
Maximum Power Voltage (Vmp)	38.4V	38.1V	37.9V	37.7V	37.5V
Maximum Power Current (Imp)	8.69A	8.65A	8.61A	8.56A	8.50A
Open Circuit Voltage (Voc)	46.8V	46.5V	46.3V	46.1V	45.9V
Short Circuit Current (Isc)	9.22A	9.18A	9.13A	9.08A	9.02A

MECHANICAL SPECIFICATIONS

Cell Type	166mm x 83mm
Number of Cells	144 half-cells (6×24)
Weight	24 kg
Dimension	2115×1052×35mm
Front Glass	3.2mm, Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Junction Box	IP67 rated
Frame	Anodized Aluminium Alloy
Output cables	4mm² ; Portrait:255mm(+)/355mm(-) Or customized

TEMPERATURE COEFFICIENT

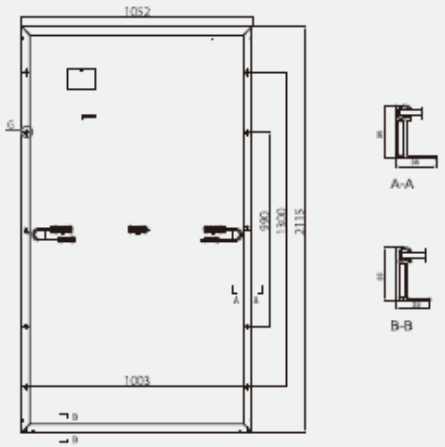
Temp. Coeff. of Isc (TK Isc)	0.057% /℃
Temp. Coeff. of Voc (TK Voc)	-0.286%/℃
Temp. Coeff. of Pmax (TK Pmax)	-0.037%/℃

PACKING MANNER

Container	40' HQ
Pieces per Pallet	30
Pieces per Container	660

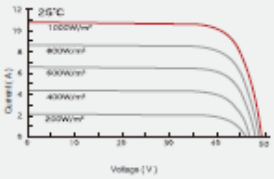
PHYSICAL CHARACTERISTICS

Unit:mm (inch)

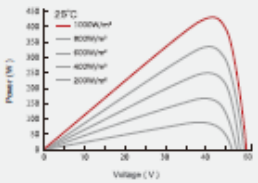


ELECTRICAL CHARACTERISTICS

Current-Voltage Curves (430W)



Power-Voltage Curves (430W)

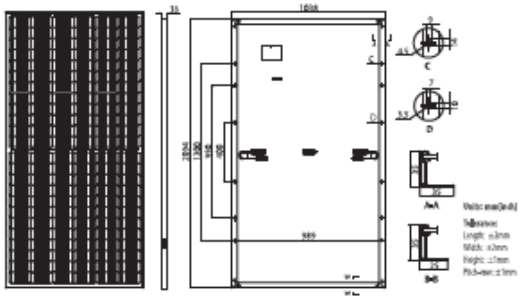


Note: the specifications are obtained under the Standard Test Conditons (STCs): 1000 W/m² solar irradiance, 1.5 Air Mass, and cell temperature of 25℃. The NOCT is obtained under the Test Conditions: 800 W/m², 20℃ ambient temperature, 1m/s wind speed, AM 1.5 spectrum.
Please contact *support@etsolar.hk* for technical support. The actual transactions will be subject to the contracts. This parameters is for reference only and it is not a part of the contracts.
The specifications are subject to change without prior notice.

Longi 445

LR4-72HPH 425~455M

Design (mm)



Mechanical Parameters

Cell Orientation: 144 (6×24)
Junction Box: IP68, three diodes
Output Cable: 4mm², 1400mm in length
(for EU DG)
Glass: Single glass
3.2mm coated tempered glass
Frame: Anodized aluminum alloy frame
Weight: 23.5kg
Dimension: 2094×1038×35mm
Packaging: 30pcs per pallet
150pcs per 20'GP
660pcs per 40'HC

Operating Parameters

Operational Temperature: -40℃ ~ +85℃
Power Output Tolerance: 0 ~ +5 W
Voc and Isc Tolerance: ±3%
Maximum System Voltage: DC1500V (IEC/UL)
Maximum Series Fuse Rating: 20A
Nominal Operating Cell Temperature: 45±2℃
Safety Class: Class Ⅱ
Fire Rating: UL type 1 or 2

Electrical Characteristics

Test uncertainty for Pmax: ±3%

Model Number	LR4-72HPH-425M		LR4-72HPH-430M		LR4-72HPH-435M		LR4-72HPH-440M		LR4-72HPH-445M		LR4-72HPH-450M		LR4-72HPH-455M	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	425	317.4	430	321.1	435	324.9	440	328.6	445	332.3	450	336.1	455	339.8
Open Circuit Voltage (Voc/V)	48.3	45.3	48.5	45.5	48.7	45.7	48.9	45.8	49.1	46.0	49.3	46.2	49.5	46.4
Short Circuit Current (Isc/A)	11.23	9.08	11.31	9.15	11.39	9.21	11.46	9.27	11.53	9.33	11.60	9.38	11.66	9.43
Voltage at Maximum Power (Vmp/V)	40.5	37.7	40.7	37.9	40.9	38.1	41.1	38.3	41.3	38.5	41.5	38.6	41.7	38.8
Current at Maximum Power (Imp/A)	10.50	8.42	10.57	8.47	10.64	8.53	10.71	8.59	10.78	8.64	10.85	8.70	10.92	8.75
Module Efficiency(%)	19.6		19.8		20.0		20.2		20.5		20.7		20.9	

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25℃, Spectra at AM1.5

NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², Ambient Temperature 20℃, Spectra at AM1.5, Wind at 1m/S

Temperature Ratings (STC)

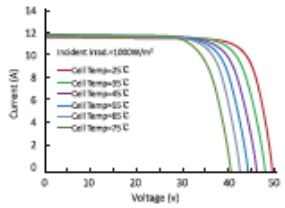
Temperature Coefficient of Isc	+0.048%/℃
Temperature Coefficient of Voc	-0.270%/℃
Temperature Coefficient of Pmax	-0.350%/℃

Mechanical Loading

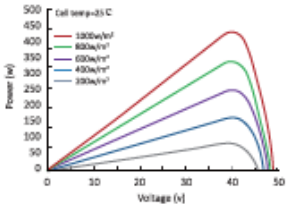
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

I-V Curve

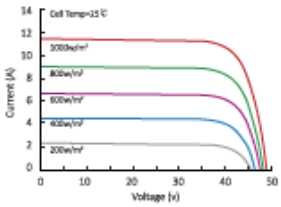
Current-Voltage Curve (LR4-72HPH-440M)



Power-Voltage Curve (LR4-72HPH-440M)



Current-Voltage Curve (LR4-72HPH-440M)



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20200414V11 for EU DG only

Longi 540

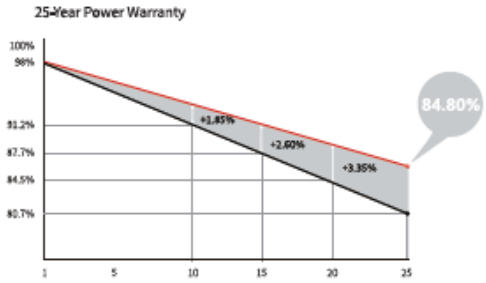
Hi-MO 5m

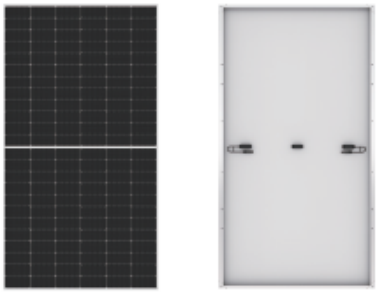
LR5-72HPH 540~560M

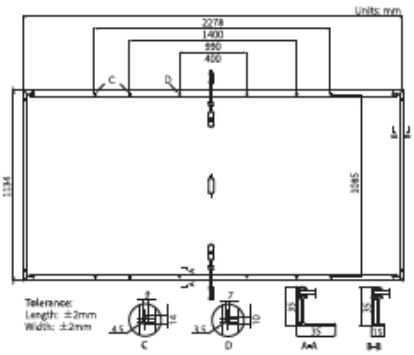
21.7%	0~3%	<2%	0.55%	HALF-CELL
MAX MODULE EFFICIENCY	POWER TOLERANCE	FIRST YEAR POWER DEGRADATION	YEAR 2-25 POWER DEGRADATION	Lower operating temperature

Additional Value

25-Year Power Warranty







Mechanical Parameters

Cell Orientation	144 (6×24)
Junction Box	IP68, three diodes
Output Cable	4mm², +400, -200mm/±1400mm length can be customized
Glass	Single glass, 3.2mm coated tempered glass
Frame	Anodized aluminum alloy frame
Weight	27.5kg
Dimension	2278×1134×35mm
Packaging	31pcs per pallet / 155pcs per 20' GP / 620pcs per 40' HC

Electrical Characteristics

STC : AM1.5 1000W/m² 25°C NOCT : AM1.5 800W/m² 20°C 1m/s Test uncertainty for Pmax: ±3%

Module Type	LR5-72HPH-540M		LR5-72HPH-545M		LR5-72HPH-550M		LR5-72HPH-555M		LR5-72HPH-560M	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	540	403.6	545	407.4	550	411.1	555	414.8	560	418.6
Open Circuit Voltage (Voc/V)	49.50	46.54	49.65	46.68	49.80	46.82	49.95	46.97	50.10	47.11
Short Circuit Current (Isc/A)	13.85	11.20	13.92	11.25	13.98	11.31	14.04	11.35	14.10	11.40
Voltage at Maximum Power (Vmp/V)	41.65	38.69	41.80	38.83	41.95	38.97	42.10	39.11	42.25	39.25
Current at Maximum Power (Imp/A)	12.97	10.43	13.04	10.49	13.12	10.56	13.19	10.61	13.26	10.67
Module Efficiency(%)	20.9		21.1		21.3		21.5		21.7	

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

LONGi

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Tel: +86-21-80162606
Web: www.longi.com

Specifications included in this datasheet are subject to change without notice. LONGi reserves the right of final interpretation. (20220810V16) G2

ET Solar 540

ETECTRICAL SPECIFICATIONS

Module Type	ET-M7728H530WW ET-M7728H530WB	ET-M7728H535WW ET-M7728H535WB	ET-M7728H540WW ET-M7728H540WB	ET-M7728H545WW ET-M7728H545WB	ET-M7728H550WW ET-M7728H550WB
Maximum Power -P_{mp} (W)	530	535	540	545	550
Open Circuit Voltage -V_{oc} (V)	49.30	49.45	49.60	49.75	49.90
Short Circuit Current -I_{sc} (A)	13.72	13.79	13.86	13.93	14.00
Maximum Power Voltage -V_{mp} (V)	41.31	41.47	41.64	41.80	41.96
Maximum Power Current -I_{mp} (A)	12.83	12.90	12.97	13.04	13.11
Module Efficiency STC -η_m (%)	20.5%	20.7%	20.9%	21.1%	21.3%
Power Tolerance (W)			(0 , +4.99)		
Maximum System Voltage			1500VDC		
Maximum Series Fuse Rating			25A		
Operating Temperature			-40~ +85 °C		
Nominal Operating Cell Temperature			45 ±2 °C		

STC: Irradiance 1000 W/m² module temperature 25°C AM=1.5

ELECTRICAL SPECIFICATIONS(NOCT)

Module Type	ET-M7728H530WW ET-M7728H530WB	ET-M7728H535WW ET-M7728H535WB	ET-M7728H540WW ET-M7728H540WB	ET-M7728H545WW ET-M7728H545WB	ET-M7728H550WW ET-M7728H550WB
Maximum Power -P_{mp} (W)	397	401	405	409	413
Open Circuit Vdtage -V_{oc} (V)	46.20	46.24	46.28	46.32	46.36
Short Circuit Current -I_{sc} (A)	11.29	11.38	11.46	11.54	11.62
Maximum Power Vdtage -V_{mp} (V)	37.18	37.24	37.30	37.36	37.42
Maximum Power Current -I_{mp} (A)	10.69	10.77	10.86	10.94	11.04

MECHANICAL SPECIFICATIONS

External Dimension	2279 x 1134 x 35mm
Weight	28kg
Solar Cells	PERC Mono crystalline 182 x 91 mm (144pcs)
Front Glass	3.2mm AR coating tempered glass
Frame	Anodized aluminium alloy
Junction Box	IP68, 3 diodes
Cable Length (including Connector)	4.0 mm² (12AWG), Portrait:300 mm(+)/400mm(-);Or customized
Connector	MC4 Compatible

APPLICATION CONDITIONS

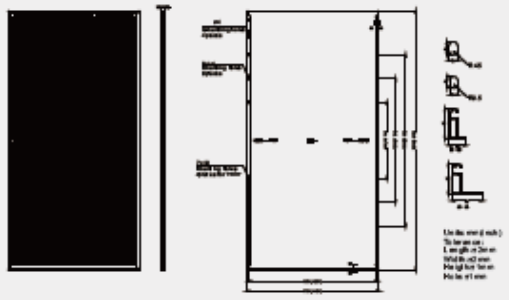
Pmax Temperature Coefficient	-0.340%/°C
Voc Temperature Coefficient	-0.263%/°C
Isc Temperature Coefficient	+0.054%/°C
Fire Performance	Class C(IEC)/Type 1(UL)

PACKING MANNER

Container	40'HQ
Pieces per Pallet	31
Pallets per Container	20
Pieces per Container	620

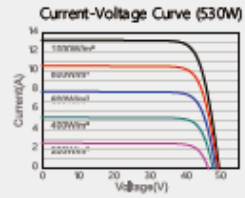
PHYSICAL CHARACTERISTICS

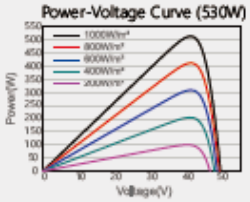
Unit:mm



*The above drawing is a graphical representation of the product.
For engineering quality drawings please contact ET Solar.

CURVE





Note: the specifications are obtained under the Standard Test Conditions (STCs): 1000 W/m² solar irradiance, 1.5 Air Mass, and cell temperature of 25°C. The NOCT is obtained under the Test Conditions: 800 W/m², 20°C ambient temperature, 1m/s wind speed, AM 1.5 spectrum.
Please contact info@etsolar.com for technical support. The actual transactions will be subject to the contracts. This parameters is for reference only and it is not a part of the contracts.
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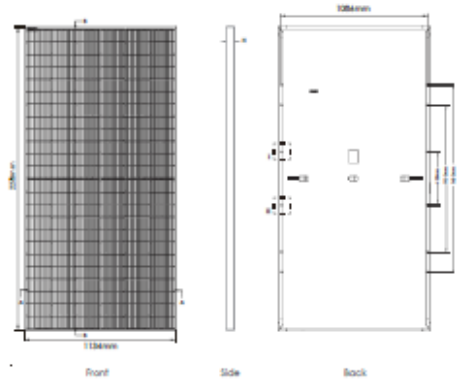
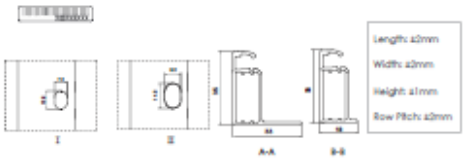
Jinko Solar 555

Engineering Drawings



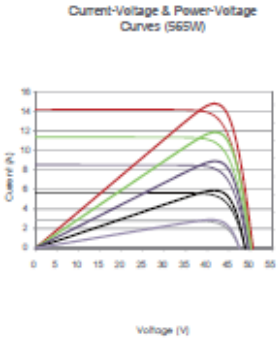


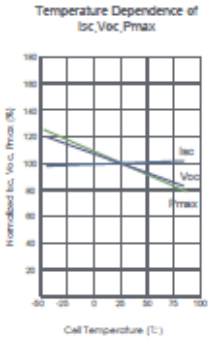
Packaging Configuration

(Two pallets = One stack)

31pcs/pallets, 62pcs/stack, 620pcs/ 40'HQ Container

Electrical Performance & Temperature Dependence





Mechanical Characteristics

Cell Type	N type Mono-crystalline
No. of cells	144 (6×24)
Dimensions	2278×1134×35mm (89.69×44.65×1.38 inch)
Weight	28 kg (61.73 lbs)
Front Glass	3.2mm,Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP68 Rated
Output Cables	TUV 1×4.0mm² (+): 400mm, (-): 200mm or Customized Length

SPECIFICATIONS

Module Type	JKM555N-72HL4 JKM555N-72HL4-V		JKM560N-72HL4 JKM560N-72HL4-V		JKM565N-72HL4 JKM565N-72HL4-V		JKM570N-72HL4 JKM570N-72HL4-V		JKM575N-72HL4 JKM575N-72HL4-V	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	555Wp	417Wp	560Wp	421Wp	565Wp	425Wp	570Wp	429Wp	575Wp	432Wp
Maximum Power Voltage (Vmp)	41.64V	39.12V	41.77V	39.25V	41.92V	39.38V	42.07V	39.51V	42.22V	39.60V
Maximum Power Current (Imp)	13.33A	10.67A	13.41A	10.73A	13.48A	10.79A	13.55A	10.85A	13.62A	10.92A
Open-circuit Voltage (Voc)	50.34V	47.82V	50.47V	47.94V	50.60V	48.06V	50.74V	48.20V	50.88V	48.33V
Short-circuit Current (Isc)	14.07A	11.36A	14.15A	11.42A	14.23A	11.49A	14.31A	11.55A	14.39A	11.62A
Module Efficiency STC (%)	21.48%		21.68%		21.87%		22.07%		22.26%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1000/1500VDC (IEC)									
Maximum series fuse rating	25A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.30%/°C									
Temperature coefficients of Voc	-0.25%/°C									
Temperature coefficients of Isc	0.046%/°C									
Nominal operating cell temperature (NOCT)	45±2°C									

*STC: Irradiance 1000W/m² Cell Temperature 25°C AM=1.5

NOCT: Irradiance 800W/m² Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

JKM555-575N-72HL4-(V)-F1-EN (IEC 2016)

C-Sun 320

Electrical Characteristics at Standard Test Conditions (STC)

Module Type	CSUN 315-60M	CSUN 320-60M	CSUN 325-60M	CSUN 330-60M
Maximum Power - Pmpp (W)	315	320	325	330
Positive Power Tolerance	0~5W	0~5W	0~5W	0~5W
Open Circuit Voltage - Voc (V)	40.53	40.78	41.04	41.30
Short Circuit Current - Isc (A)	10.11	10.18	10.25	10.32
Maximum Power Voltage - Vmpp (V)	32.89	33.17	33.44	33.75
Maximum Power Current - Impp (A)	9.58	9.65	9.72	9.78
Module Efficiency	19.1%	19.4%	19.7%	20%

Electrical data relates to standard test conditions (STC) : irradiance 1000W/m² ; AM 1.5 ; cell temperature 25°C measuring uncertainty of power is within ±3%. Certified in accordance with IEC61215, IEC61730-1/2 and UL 1703.

Electrical Characteristics at Nominal Operating Cell Temperature (NOCT)

Module Type	CSUN 315-60M	CSUN 320-60M	CSUN 325-60M	CSUN 330-60M
Maximum Power - Pmpp (W)	233	237	241	244
Open Circuit Voltage - Voc (V)	38.25	38.56	38.85	39.16
Short Circuit Current - Isc (A)	7.79	8.01	8.05	8.09
Maximum Power Voltage - Vmpp (V)	31.00	31.32	31.64	31.96
Maximum Power Current - Impp (A)	7.52	7.56	7.60	7.64

Electrical data relates to nominal operating cell temperature (NOCT): irradiance 800 W/m² ; wind speed 1 m/s ; cell temperature 45°C ambient temperature 20°C measuring uncertainty of power is within ±3%

Temperature Characteristics

Voltage Temperature Coefficient	-0.307%/K
Current Temperature Coefficient	+0.039%/K
Power Temperature Coefficient	-0.423%/K

Maximum Ratings

Maximum System Voltage (V)	1000&1500
Series Fuse Rating (A)	20
Reverse Current Overload (A)	27

Mechanical Characteristics

Dimensions	1640 × 992 × 35 mm
Weight	18.4 kg ± 3%
Frame	Anodized aluminum profile
Front Glass	Toughened low iron glass, 3.2 mm
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate)
Back Sheet	Composite film
Cells	6 × 10 monocrystalline solar cells (158.75X158.75mm)
Junction Box	Rated current ≥13 A, IP ≥ 67, TUV & UL
Cable	Length 900 mm, 1 ×4 mm²
Connector	Compatiable with MC4

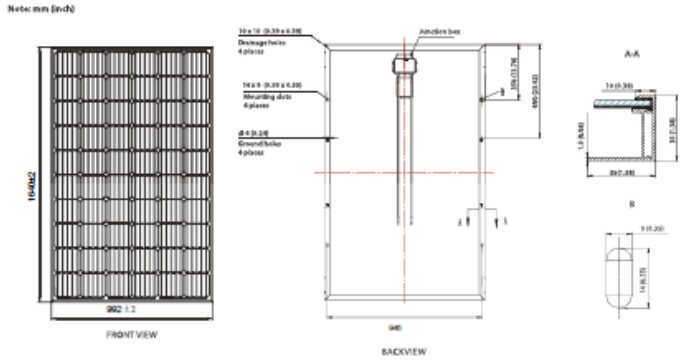
Packaging

Container 20'	300 pcs.
Container 40'	840 pcs.
Container 40' HQ	910 pcs.
Each Pallet	30 pcs.

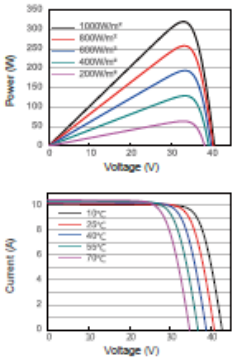
System Design

Temp. Range	-40°C to + 85°C
Hail	Max. diameter of 25mm with impact speed of 23m/s
Max. Capacity	Snow 5400 Pa, wind 2400 Pa
Application Class	A
Safety Class	II

Dimensions



IV-Curves



Lampiran 7 Datasheet baterai

Power Plus Eco Series 78

EASY TO INSTALL RELIABLE POWER

With a 4.0kWh capacity the Eco P Series, a highly modular lithium battery, is designed to suit various applications ranging from residential, industrial, commercial and telecommunication.

Product Highlights:

- Free Warranty Returns
- Increased Storage Efficiency
- Flexible Capacity Design
- Multiple Install Options
- Safe Lithium Chemistry
- Compatible with AC & DC coupled Systems
- Mechanically Robust Cylindrical Cells
- Ongoing Local Support

	Eco4840P
Nominal DC Voltage	51.2V
Operational Voltage Window	40V to 58.4V
Nominal Capacity	4.0kWh (3.99Ɔ) / 78Ah
Usable Capacity	4.0kWh (3.99Ɔ)
Recommended Usable Capacity	3.2kWh (3.19Ɔ)
Depth of Discharge	Up to 100%
Recommended Depth of Discharge	80% or less
Continuous Discharge C-Rate	0.5C (C2)
Continuous Discharge current	39A
Continuous Discharge Power	2.0kW
Maximum Discharge (Limited by K-Curve Circuit Breaker) (Refer manual for circuit breaker characteristics)	66A* (3.22kW)
Maximum Charge Current	63A
Warrantable Charge Current	39A
Warrantable Charge Power	2.0kW
Prospective Fault Current (1ms)	250A
Circuit Breaker (k Curve)	2-Pole 63A 360VDC
Lithium Composition	Lithium Ferro Phosphate (LiFePO4 or LFP)
Operating Temperature Range	Charge: 0° to 55°C / Discharge -20° to 60°C
Ideal Operating Temperature Range	0 to 45°C
Operating Humidity	85% Non Condensating

Narada Battery REXC 600

Narada
stored energy solutions for a demanding world

REX-600
Renewable Energy Storage Batteries

Renewable Energy Storage Batteries

Features & Benefits

- Long life design for both cyclic and float applications
- Superb security and reliability
- Robust design inside and out
- Excellent deep discharge recovery fast recharge performance
- Extra long back-up times
- More cost effective than nearest equivalent

Narada's REX battery is designed for Renewable Energy Sources such as Solar and Wind Power. REX protects our environment using Green Technology and benefits the World's Urban and Rural Population by Generating Power Economically from a Clean Source of Energy. REX is a product developed by Narada's R&D with an "eXtra" in Performance and Life Span.

Standards

Test standards
IEC60896-21/-22, IEC61427, YD/T 799 etc.
Safety standard, ventilation
EN 50272-2
Manufactured under system
ISO9001/TL9000 & ISO14001 by Narada

Technical specifications

Electrical data	
Nominal voltage	2 V
Number of cells	1
Rated capacity(25℃)	600 Ah - 60A for 10h to 1.80V/cell
	720 Ah - 6A for 120h to 1.85V/cell
Internal resistance	0.23 mΩ (acc. to IEC 60896-21)
Short circuit current	8614 A (acc. to IEC60896-21)
Self discharge(25℃)	less than 2% per month
Design life at 20℃	20 years
Mechanical data	
Weight ready for use	48 kg (105.8 lbs)
Length	231 mm (9.09 in)
Width	180 mm (7.09 in)
Height of monobloc	396 mm (15.59 in)
Total height	408 mm (16.06 in)
Terminal	M8 female
Terminal hardware torque	10 - 12 Nm

Constant Current Discharge Data Units: Amperes (25℃,77℉)

End	Time (minutes)		Time (hours)										
Voltage	15	30	1	3	5	8	10	12	20	24	48	72	120
1.70V	734	548	356	161	111	76.8	64.2	54.4	33.2	28.5	14.8	10.1	6.42
1.75V	694	509	339	156	108	75.8	63.2	53.6	32.9	28.2	14.6	9.96	6.32
1.80V	655	476	318	151	106	74.4	61.8	52.3	32.3	27.7	14.2	9.74	6.18
1.83V	615	453	298	146	103	73.1	60.5	51.4	31.7	27.1	13.9	9.53	6.10
1.85V	581	425	287	143	102	72.3	60.1	51.1	31.3	26.8	13.8	9.48	6.01
1.90V	491	364	255	135	98.4	69.5	58.1	49.6	30.6	26.2	13.4	9.16	5.81

Constant Power Discharge Data Units: Watts per cell (25℃,77℉)

End	Time (minutes)		Time (hours)										
Voltage	15	30	1	2	3	4	5	6	7	8	10	12	24
1.70V	1322	1049	713	486	333	269	229	197	172	153	125	114	58.0
1.75V	1272	1013	685	449	321	263	224	192	167	147	124	112	57.2
1.80V	1212	977	669	441	309	255	217	187	162	143	122	111	56.3
1.83V	1157	921	645	423	302	251	213	181	158	141	119	109	55.2
1.85V	1104	869	609	405	293	245	207	177	155	139	117	108	54.1
1.90V	958	733	524	352	272	228	194	165	147	130	108	98.8	50.2

TBB LS50 Lithium 50

TBB POWER

www.tbbpower.com

Super L Series

LITHIUM BATTERY MODULE

LS50: 48V 50Ah 2.4kWh **LS75:** 48V 75Ah 3.6kWh

Super L Series battery module is widely used in energy storage and electrical products including household energy storage systems and centralized power station energy storage system.

- Advanced high capacity, 90% DOD and 6000 cycles life
- Equipped with intelligent BMS for each battery pack to manage modules effectively
- Compared with the traditional module, Super L Series can meet the capacity storage and greatly enhance the cycle life
- Safe lithium iron phosphate battery cell
- Compact size ultralight module
- Practical pull ear design improves operation convenience

Model No .	LS50	LS75
Cell Technology	Li-ion (LFP)	
Battery Module Capacity (kWh)	2.4	3.6
Battery Module Voltage (Vdc)	48	
Battery Module Capacity (Ah)	50	75
Battery Module Cell Quantity (pcs)	30	45
Battery Cell Capacity (Wh)	80	
Battery Cell Voltage (Vdc)	3. 2	
Battery Cell Capacity (AH)	25	
Battery Module Cell Quantity in Series (pcs)	15	
Battery Module Charge Voltage (Vdc)	53. 5	
Battery Module Charge Current (Normal)	25	37.5
Battery Module Discharge lower-Voltage (Vdc)	42	
Battery Module Discharge Current (Normal)	25	37.5
Battery Module Charge Current (Max. in 1s)	55	55
Cycle Life	90% DOD and 6000 cycles life	
Dimension (mm)	480x360x90	480x360x132
Communication	CAN / RS485	
Pollution Degree (PD)	II	
Protection category	IP20	
Weight (kg)	22	32

Power Plus 128

PREMIUM LITHIUM POWER FOR ALL YOUR ENERGY STORAGE NEEDS

Built with premium lithium cells, the LiFe series is robust, reliable and suited to harsh environments.

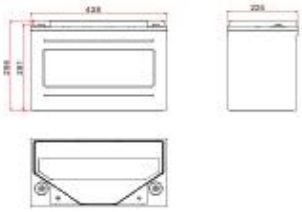
Product Highlights:

- Free Warranty Returns
- Increased Storage Efficiency
- Flexible Capacity Design
- Multiple Install Options
- Safe Lithium Chemistry
- Compatible with AC & DC coupled Systems
- Mechanically Robust Cylindrical Cells
- Ongoing Local Support

	LiFe2433P	LiFe4833P	LiFe4822P (Short Depth)	LiFe12033P
Nominal DC Voltage	25.6V	51.2V		128.0V
Operational Voltage Window	20V to 29.2V	40V to 58.4V		(110V) / 123.2V to 146V
Nominal Capacity	3.3KWh (3.277) / 128Ah	3.3KWh (3.277) / 64Ah	2.2kWh (2.211) / 43Ah	3.3KWh (3.277) / 25.6Ah
Usable Capacity	3.3kWh (3.277)	3.3kWh (3.277)	2.2kWh (2.211)	2.97kWh (2.95)
Recommended Usable Capacity	2.64kWh	2.64kWh	1.76kWh	2.64kWh
Depth of Discharge	Up to 100%			Up to 90%
Recommended Depth of Discharge	80% or less			
Continuous Discharge C-Rate	0.5C (C2)	1C (C1)		
Continuous Discharge current	63A	63A	43A	25A
Continuous Discharge Power	1.61kW	3.22kW	2.20kW	3.20kW
Maximum Discharge (Limited by K-Curve Circuit Breaker) (Refer manual for circuit breaker characteristics)	63A* (1.61kW)	63A* (3.22kW)	63A* (3.22kW)	25A* (3.20kW)
Maximum Charge Current	63A	63A	63A	25A
Warrantable Charge Current	63A	32A	21.5A	12.8A
Warrantable Charge Power	1.61kW	1.63kW	1.10kW	1.63kW
Prospective Fault Current (1ms)	250A			110A
Circuit Breaker (K Curve)	2-Pole 63A 660VDC			2-Pole 25A 660VDC
Lithium Composition	Lithium Ferro Phosphate (LiFePO4 or LFP)			
Operating Temperature Range	Charge: 0° to 55°C / Discharge -20° to 60°C			
Ideal Operating Temperature Range	0 to 45°C			
Operating Humidity	85% Non Condensating			

Narada Battery REXC 200

Dimension



Feature

- Design life 20 years
- Combine the advantage of lead acid battery and supercapacitor
- Ideal for PSOC cycle application
- High power, rapid charge/discharge
- Reduce sulfation of negative plate, excellent recharge acceptance performance
- Waterproof, anti-salt treatment, shockproof module installation design
- Comply with IEC60896,IEC61427 etc. standard

Application

- Home energy storage system
- Smart power grids and microgrid system
- Distributed energy storage system
- Hybrid energy storage system such as solar and wind
- Solar power generation grid/off-grid energy storage system
- Emergency lighting system
- Generator and battery hybrid energy system
- Other standby, cycling system

Parameter

Nominal Voltage	12V
Capacity	200Ah (100hr to 1.85V/cell @25°C)
	165Ah (10hr to 1.80V/cell @25°C)
Typical Weight	79.5kg
Internal Resistance	Approx 3.83mΩ (acc. to IEC60896-21 clause 6.3)
Short-Circuit Current	3274A
Self Discharge	Residual capacity is above 90% after 90 days storage(25°C)
Temperature Ranges	Operation(recommended):15°C~25°C
	Operation(maximum):-20°C~50°C
Max. charging current	49.5A
Max. constant charging current	33A
Charge Voltage	Floating: 2.25V/cell(25°C)
	Equalizing/Cycle: 2.30V/cell 25°C)
Terminal	M8 embedded copper
Terminal Hardware Torque	>10N.m

Constant Current Discharge Characteristics Units: Amperes(25℃)

End voltage per cell	60min	3hour	5hour	8hour	10hour	24hour	48hour	72hour	120hour
1.75V	94.25	43.33	30.08	21.08	17.58	7.83	4.04	2.77	1.76
1.80V	88.25	42.00	29.42	20.67	17.17	7.70	3.95	2.71	1.72
1.83V	82.67	40.67	28.67	20.33	16.83	7.53	3.87	2.65	1.68
1.85V	79.67	39.83	28.42	20.08	16.67	7.44	3.85	2.63	1.67
1.88V	76.33	39.00	28.08	19.83	16.58	7.38	3.82	2.61	1.66
1.90V	70.75	37.33	27.33	19.33	16.17	7.28	3.72	2.54	1.62

Discharge Data with Constant Power Units: Watts per cell(25℃)

End voltage per cell	15min	30min	1hour	2hour	3hour	4hour	5hour	6hour	8hour	10hour
1.75V	411.4	310.5	190.3	124.8	89.1	73.1	62.1	53.4	40.9	34.3
1.80V	374.1	300.6	185.9	122.5	85.9	70.8	60.3	51.9	39.8	33.8
1.83V	354.3	285.2	179.3	117.5	83.8	69.7	59.1	50.3	39.1	33.2
1.85V	344.2	270.5	169.1	112.5	81.4	68.0	57.6	49.2	38.5	32.5
1.88V	309.6	253.6	158.9	104.6	78.6	65.7	55.7	47.4	37.5	31.7

Pylontech US 3000 66.6

Specification

Basic Parameters	US2000	Phantom-S	US3000
Nominal Voltage（V）	48	48	48
Nominal Capacity (Wh)	2400	2400	3552
Usable Capacity (Wh)	2200	2200	3200
Dimension（mm）	442*410*89	440*440*88.5	442*420*132
Weight（Kg）	24	24	32
Discharge Voltage（V）	45 ~ 53.5	45 ~ 53.5	45~53.5
Charge Voltage（V）	52.5 ~ 53.5	52.5~53.5	52.5~53.5
Charge / Discharge Current（A）	25(Recommend)	25(Recommend)	37 (Recommend)
	50 (Max)	50 (Max)	74 (Max)
	100（Peak@15s）	100（Peak@15s）	100 (Peak@15s)
Communication Port	RS485，CAN	RS485，CAN	RS485，CAN
Single string quantity(pcs)	8	8	8
Working Temperature/℃	0~50	0~50	0~50
Shelf Temperature/℃	-20~60	-20~60	-20~60
Humidity	5%~85%	5%~85%	5%~85%
Altitude (m)	<2000	<2000	<2000
Design life	15+ Years（25℃/77℉）	15+ Years（25℃/77℉）	15+ Years（25℃/77℉）
Cycle Life	>6000, 25℃	>6000, 25℃	>6000, 25℃
Authentication Level	UL/IEC62619/CE /UN38.3	IEC62619/CE /UN38.3	IEC62619/CE /UN38.3

Lampiran 8 Datasheet inverter

OPS

HPC

HYBRID POWER CONDITIONER (HPC SERIES)

Providing 24 hour utility grade power in a fully integrated off-grid power converter

OPTIMAL POWER SOLUTIONS

The OPS Hybrid Power Conditioner (HPC) is a comprehensive power conversion system that integrates and optimises remote area power sources such as solar photovoltaic arrays, wind turbines, battery banks and diesel generator sets. As a bidirectional power converter the HPC can seamlessly act, phase by phase, in parallel power sharing mode or as an independent battery charger in reverse power mode.

The HPC system provides an optimal approach in delivery of continuous 24-hour power utility level voltage and frequency quality. The system maximises the use of the renewable resources in combination with the battery storage unit. When diesel generators are required the HPC intelligently loads the generator to reach greatest fuel efficiency operation. Life-cycle cost (LCOE) analyses predict an average of 60 per cent fuel savings.

Our HPC technology sets new benchmarks in the pursuit of cost-effective power supply for remote regions. Unique OPS features include internal PV maximum power point PV tracking, diesel generator phase control and balancing as well as sophisticated battery management features. With solar photovoltaic cost reductions, the HPC is ideally positioned to continue its focus on reducing fuel consumption where possible.

The HPC systems are available in single and three phase versions and can enable automated synchronisation of multiple diesel generator sets.

HIGH EFFICIENCY POWER CONVERSION

The internal power topology uses a high performance IGBT based converter with inherently high efficiency. The onboard digital signal processor technology provides ultra fast control of all system functions. The HPC and its derivative products can operate in parallel with similar capacity inverters.

ONBOARD MPPT

The standard HPC includes an internal MPPT which is rated at the inverter power capacity. This ensures that the solar PV energy is fully available to the system for the external load and battery management.

GENSET MANAGEMENT

The HPC can typically manage single or dual generator sets. The generator is used only when the battery is low in storage or the load is becoming too high. Its operational time each day can be controlled in order to achieve quiet times as well as the number of stop / starts. Generator loading is kept within the most efficient ranges to increase fuel efficiency.

www.optimal-power-solutions.com

Global leaders in renewable power technology

BATTERY MANAGEMENT

Lead acid batteries are the common choice of energy storage and the HPC includes a sophisticated multiple stage charging regime for this technology. The charging management will optimise the battery life and ensure cost effective deployment of the available energy reserves.

COMMUNICATION, MONITORING AND CONTROL

Industry standard ethernet ports and modems are provided which allow connection both locally or remotely via RS232 or RS485. OPS provide a range of user-friendly SCADA packages which enable local and remote monitoring and control. Please refer to our OPS Coms, Site Connect and Site Link for useful software applications.

TYPICAL APPLICATIONS

- Island electrification.
- Remote area power supply.
- Rural banks and offices.
- Rural educational facilities.
- Remote petrol stations.
- Remote commercial buildings.

	HPC -7.5	HPC -10	HPC -12.5	HPC -15	HPC -10	HPC -15	HPC -20	HPC -25	HPC -50	HPC -75	HPC -100	HPC -150	HPC -200	HPC -250	HPC -350
→ Input Values															
Nominal AC power kW	7.5	10	12.5	15	10	15	20	25	50	75	100	150	200	250	350
Nominal DC volts	120	120	120	120	120	120	120	240	240	240	240	360	360	360	360
Surge 30seconds kW	11.25	15	18.75	22.5	15	22.5	30	37.5	75	112.5	150	187.5	250	312.5	437.5
Max Genset kW	11.25	15	18.75	22.5	15	22.5	30	37.5	75	112.5	150	225	300	375	525
Genset Switching	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✘	✘	✘	✘
Typical Peak Load kVA	15	20	25	30	20	30	40	50	100	150	200	300	400	500	700
MPPT kW	7.5	10	12.5	15	10	15	20	25	50	75	100	external	external	external	external
MPPT voltage range	150-225	150-225	150-225	150-225	150-225	150-225	150-225	300-500	300-500	300-500	300-500	0	0	0	0
Max DC Link Voltage	300	300	300	300	300	300	300	650	650	650	650	0	0	0	0
→ Output Values															
Phase	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3
Nominal AC Volts	230	230	230	230	230/400	230/400	230/400	230/400	230/400	230/400	230/400	230/400	230/400	230/400	230/400
Frequency Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Inverter output breaker	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✔	✔	✔	✔
→ Other															
Digital Signal Processor	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Front panel analog meter	✘	✘	✘	✘	✘	✘	✔	✔	✔	✔	✔	✔	✔	✔	✔
Standard Data Logging	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Weight kg	150	200	250	300	300	350	400	700	800	900	1000	1000	1200	1600	2000
Dimensions H x W x D mm	1050 x 585 x 420	1050 x 585 x 420	1220 x 585 x 420	1220 x 585 x 420	1150 x 700 x 540	1150 x 700 x 540	1150 x 700 x 540	1150 x 700 x 540	1900 x 1000 x 800	1900 x 1200 x 800	1900 x 1300 x 900	1900 x 1600 x 900	1900 x 2000 x 900	1900 x 2000 x 900	1900 x 3000 x 900
Warranty years	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5