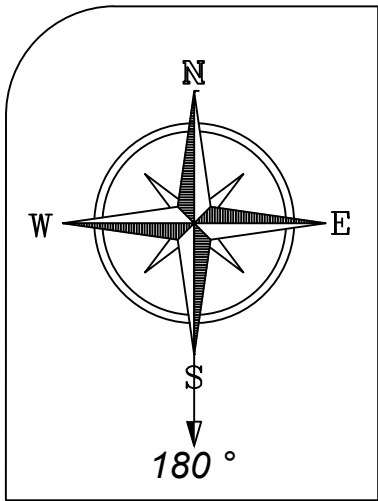




ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters		Quant'
Type :1	SolarEdge33.3kW	1
Type :2	----	----
T.Power:		33.3kVA

Panels	
Manuf:'	Chint [2256x1133x35]
Model:	540W
Quant:'	83
Tilt:	15°
Azimuth:	180°
T.Power:	44.82kWp

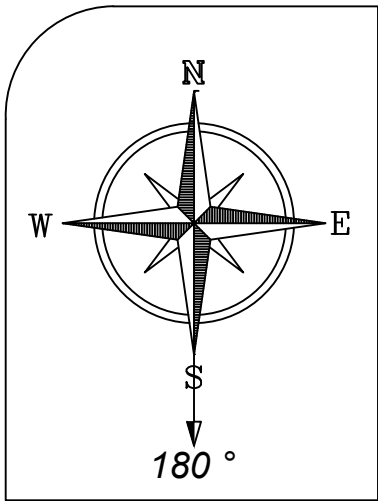
Comments	
###	###

בי"ס עליות - רמת גן

מערכת סולארית מתח נמוך - 44.82kWp

G000	רשימת תכניות
G001	תכנית הצבה
G002	תכנית חיווט
G003	תכנית קונסטרוקציה
G004	תכנית חד קווית
G005	תכנית הארקות
G007	הפסדי הולכה DC
G008	הפסדי הולכה AC

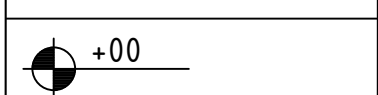
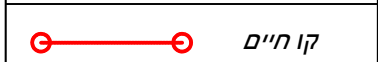
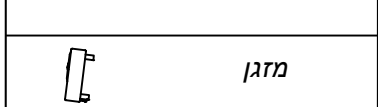
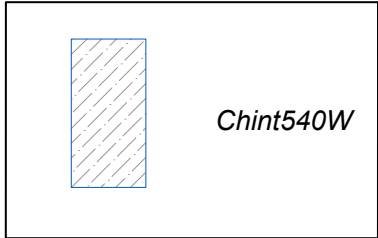




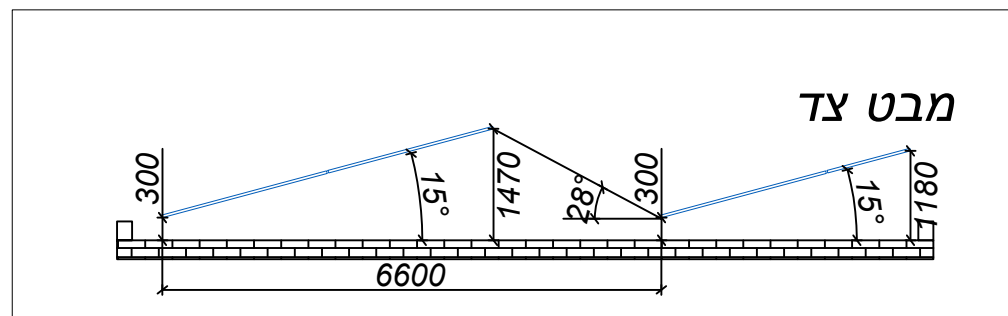
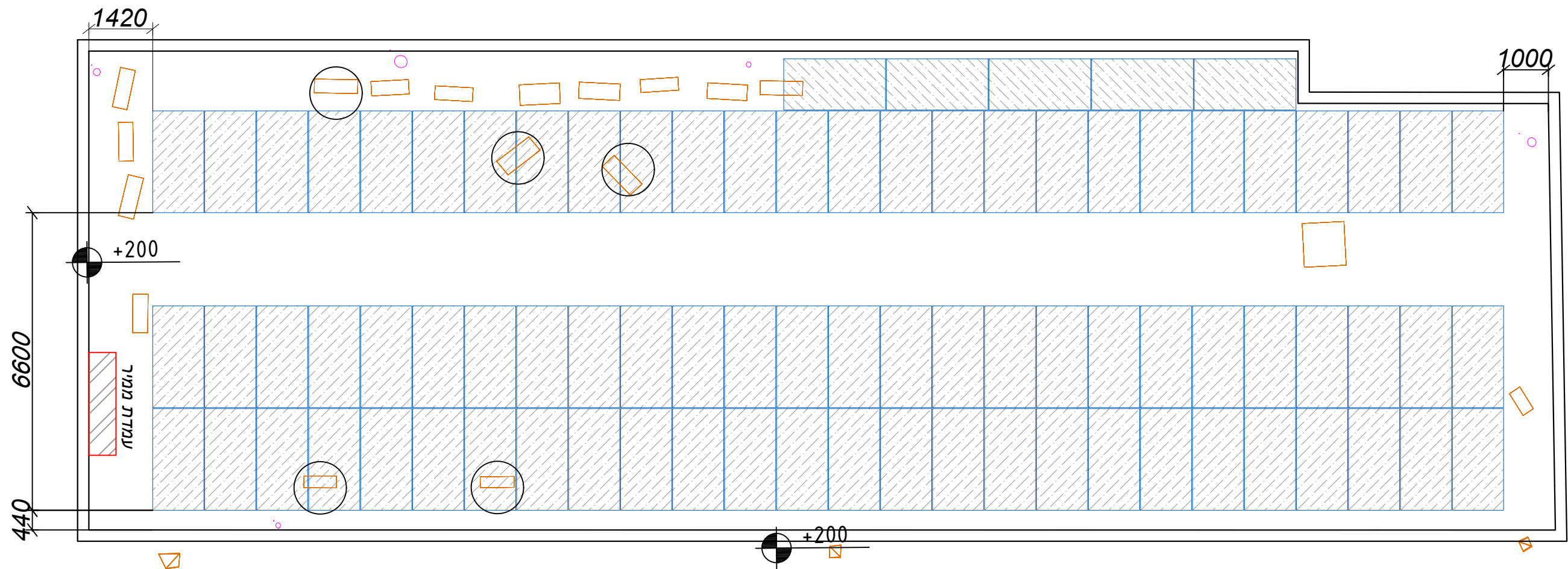
ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters	Quant'
Type :1 SolarEdge33.3kW	1
Type :2 ----	----
T.Power:	33.3kVA

Panels	
Manuf:' Chint [2256x1133x35]	
Model: 540W	
Quant:' 83	
Tilt: 15°	
Azimuth: 180°	
T.Power: 44.82kWp	

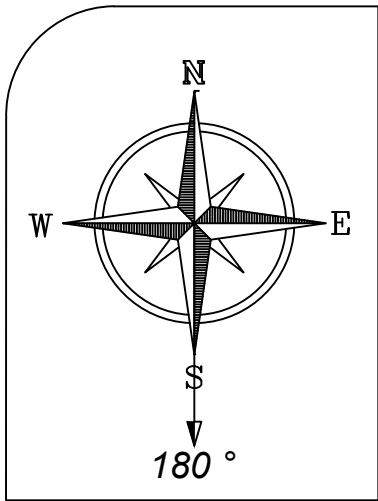


Comments	###
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בי"ס עליות, רמת גן - חלוקה לסטרינגים						540	הספק פאנל [W]
						83	כמות פאנלים
						33.3	הספק AC [kW]
						44.82	הספק DC [kWp]
						134.59%	יחס העמסה AC/DC
AC/DC	[kW] AC	הספק AC	הספק DC [kWp]	מ"ס פאנלים	מ"ס סטרינגים	Unit	סוג ממיר
134.59%	33.3	44.82	44.82	28	14	Center	SolarEdge 33.3kW
134.59%	33.3	44.82	44.82	27	14		
134.59%	33.3	44.82	44.82	83	42		

		DRAWING NUMBER: Aliyot School - G001		לאישור		לביצוע		ASMADE		TITLE:	
Client: שחר אנרגיה		Site location: רמת גן		Date: 21/12/21		Print Size: A3		Designer: Roi N.		הצבת פאנלים	



ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters	Quant'
Type :1 SolarEdge33.3kW	1
Type :2 ----	----
T.Power:	33.3kVA
Panels	
Manuf:' Chint [2256x1133x35]	
Model: 540W	
Quant:' 83	
Tilt: 15°	
Azimuth: 180°	
T.Power: 44.82kWp	

מקרא חיווט:

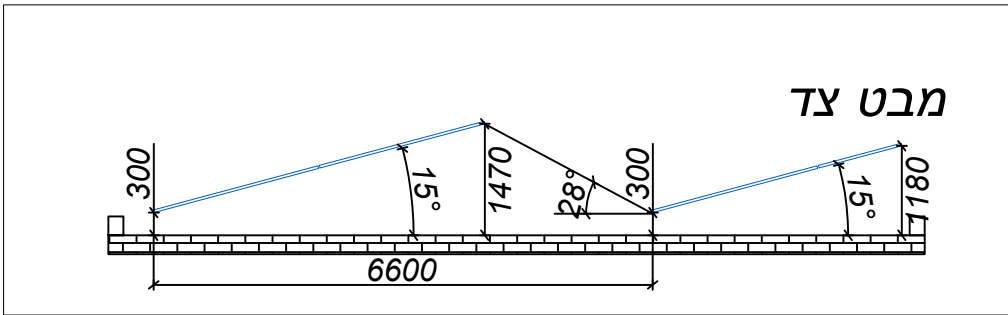
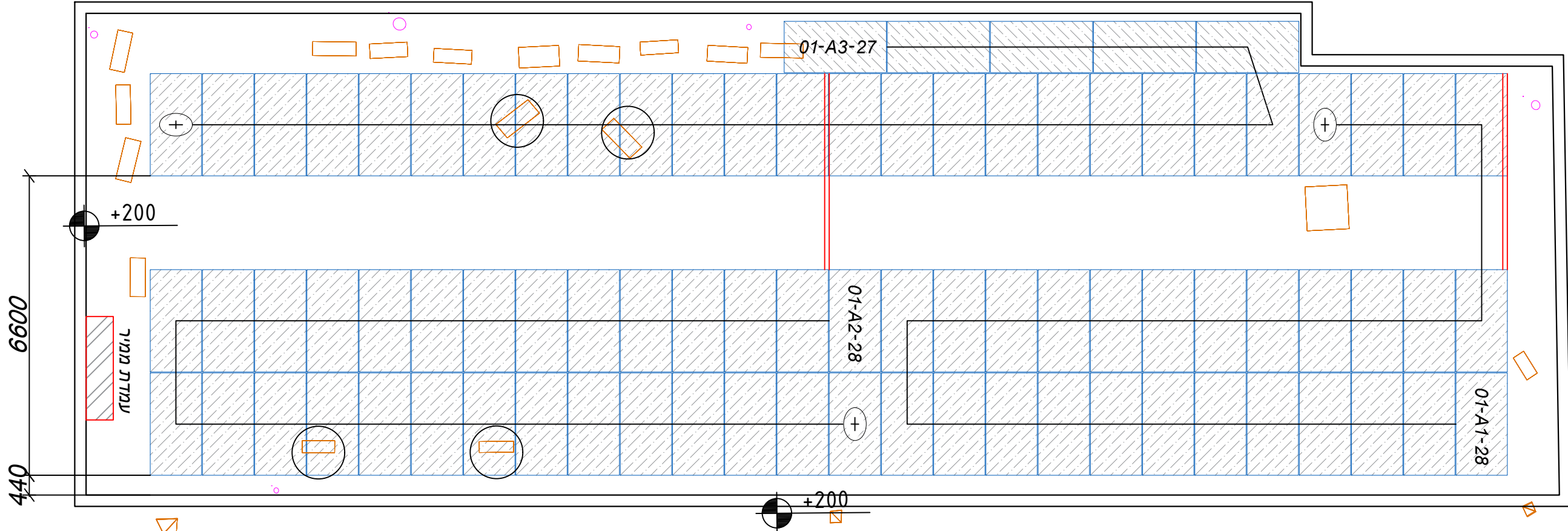
XX-YY-ZZ
XX - מספר ממיר
YY - mppt
ZZ - כמות פאנלים

כיוון חיבור סטרינג

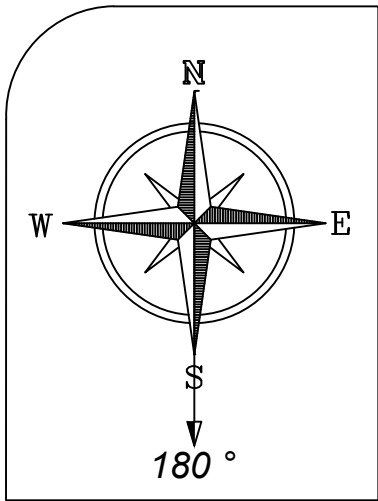
קופסת איסוף סטרינג

תעלת רשת DC

Comments	###
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בי"ס עליות, רמת גן - חלוקה לסטרינגים					540		הספק פאנל [W] :			
					83		כמות פאנלים :			
					33.3		הספק AC [kW] :			
					44.82		הספק DC [kWp] :			
					134.59%		יחס העמסה AC/DC :			
AC/DC	הספק AC [kW]	הספק DC [kWp]	מ"ס פאנלים	P1100	מ"ס סטרינגים	אופטימיזר	Unit	סוג ממיר	ממיר	סוג גג
134.59%	33.3	44.82	28		14		Center	SolarEdge 33.3kW	1	בטון
			28		14	3				
			27		14					
134.59%	33.3	44.82	83		42		סה"כ כמות:			

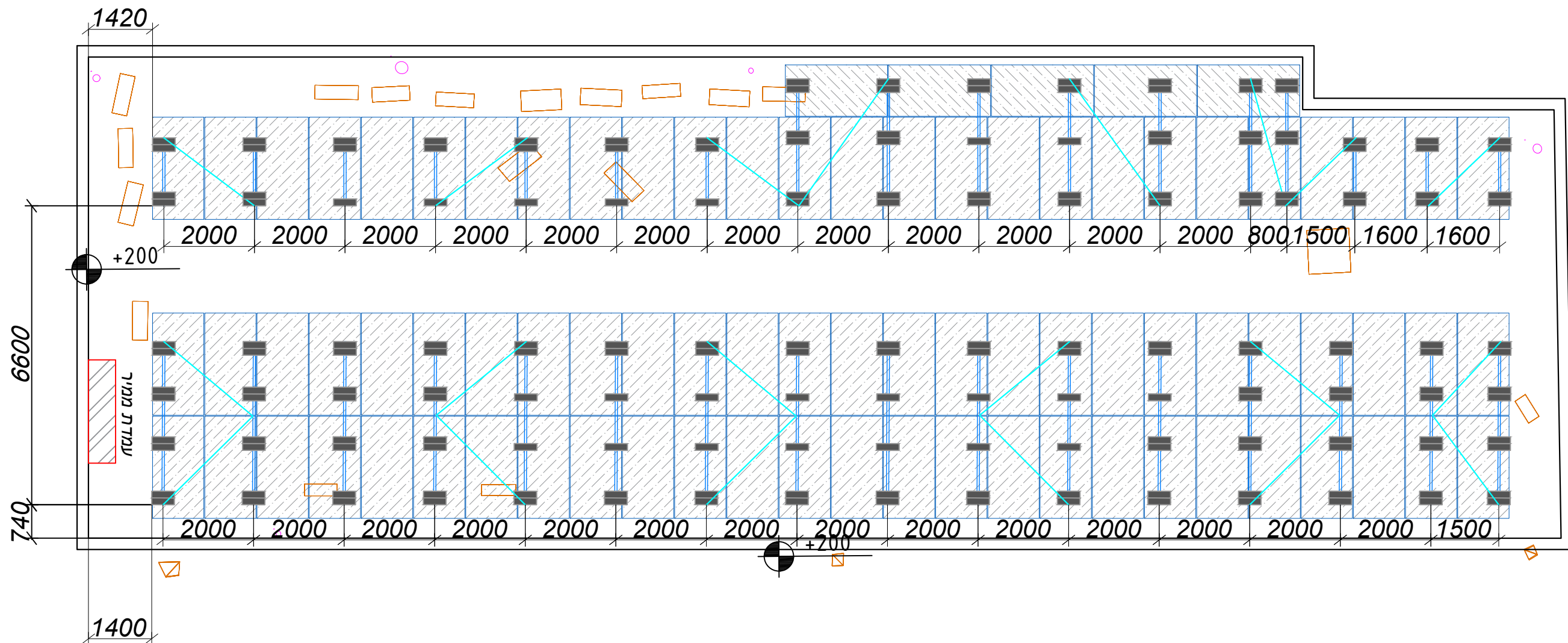


ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

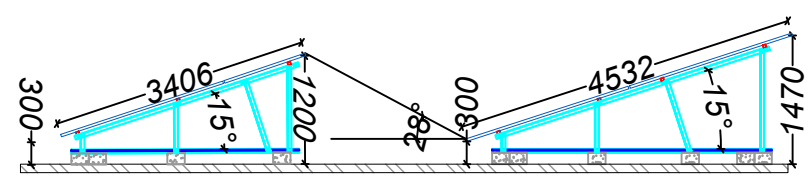
Inverters	Quant'
Type :1 SolarEdge33.3kW	1
Type :2 ----	----
T.Power:	33.3kVA

Panels	
Manuf:' Chint [2256x1133x35]	
Model:	540W
Quant:'	83
Tilt:	15°
Azimuth:	180°
T.Power:	44.82kWp

Comments	
###	###
###	



פרט התקנת קונסטרוקציה



יש לוודא מול קונסטרוקטור את תוכנית ההצבה, כמות האבנים
וחוזק הקונסטרוקציה הנושאת לפני ביצוע ההתקנה

כתב כמויות - רגליים מענית

כמות	תיאור	פרט
10	גובה מהרצפה: 300 מ"מ זווית: 15°	פאנל בודד
7	גובה מהרצפה: 300 מ"מ זווית: 15°	פאנל בודד וחצי
16	גובה מהרצפה: 300 מ"מ זווית: 15°	פאנל כפול
20	אורך 2.3 מ	דיאגונל
188	39 ק"ג גובה: 150, רוחב: 230, אורך: 500	אבנים



DRAWING NUMBER: Aliyot School - G003

Client: שחר אנרגיה

Site location: רמת גן

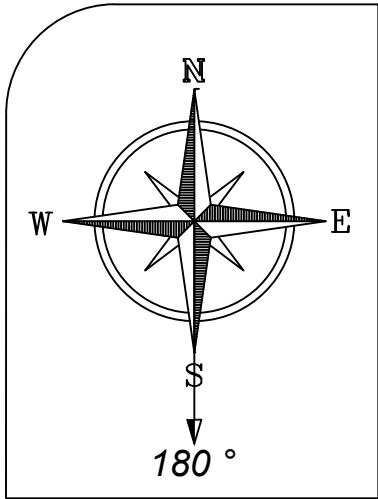
לאישור ☐ לביצוע ☐ ASMADE

Date: 21/12/21

Print Size: A3

Designer: Roi N.

TITLE: קונסטרוקציה

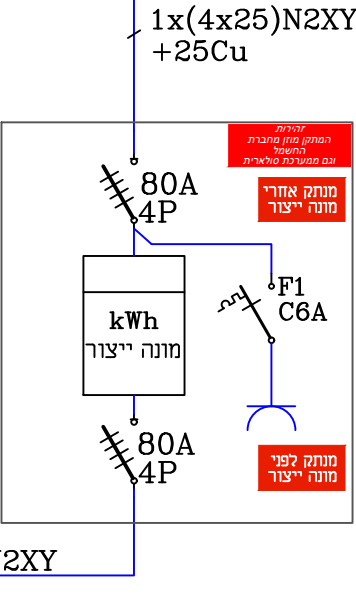
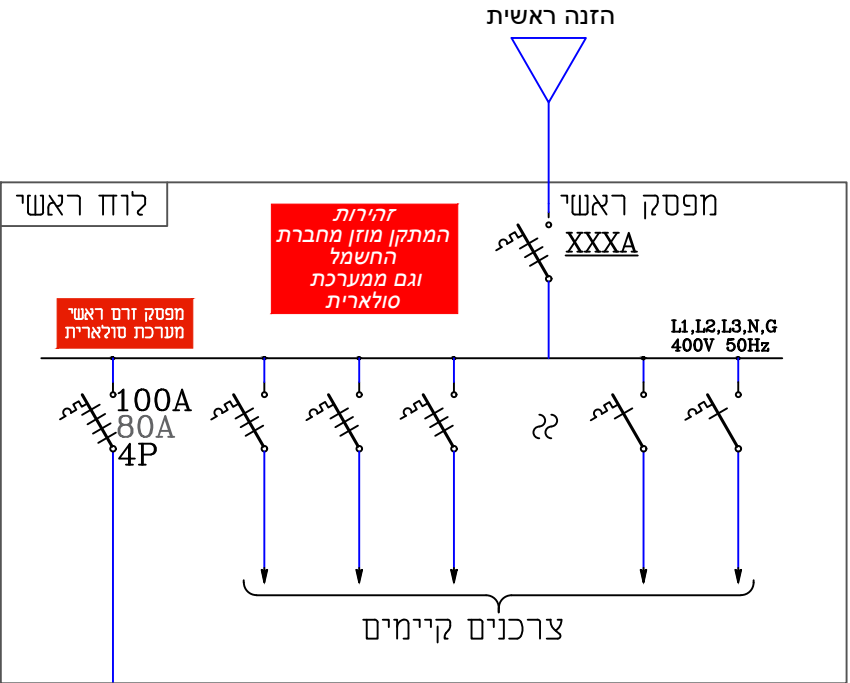
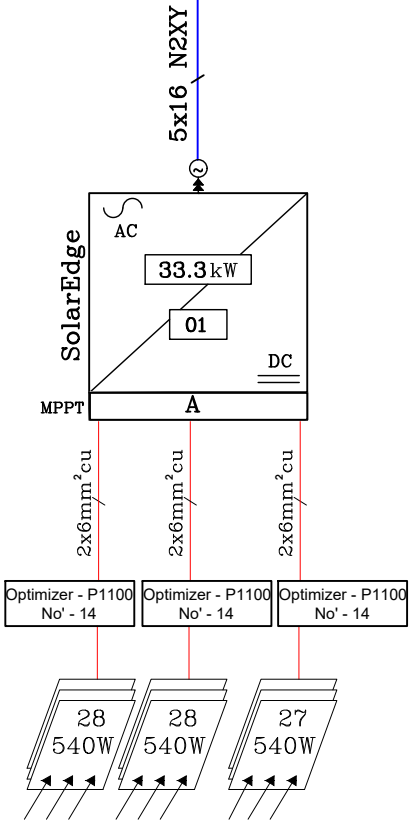
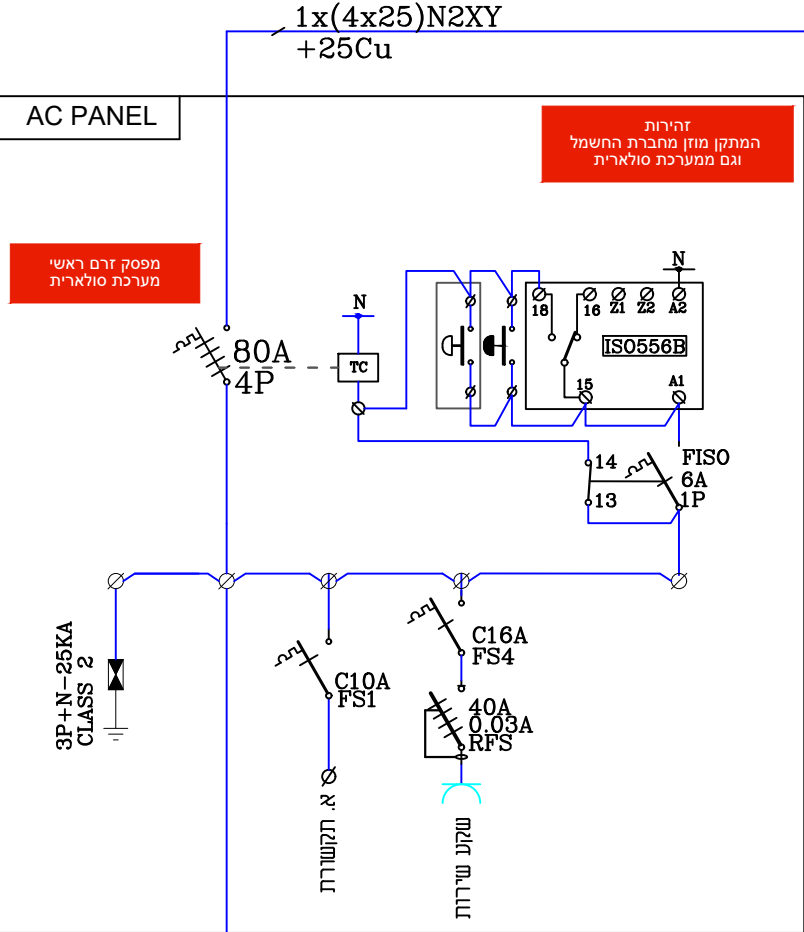


ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters	Quant'
Type :1 SolarEdge33.3kW	1
Type :2 -----	-----
T.Power:	33.3kVA

Panels	
Manuf:' Chint [2256x1133x35]	
Model: 540W	
Quant:' 83	
Tilt: 15°	
Azimuth: 180°	
T.Power:	44.82kWp

Comments	
###	###



בי"ס עליות, רמת גן - חלוקה לסטרינגים						הספק פאנל [W] :
						540
						83
						33.3
						44.82
						134.59%
AC/DC	[kW] AC	הספק [kWp] DC	מ'ס פאנלים	אופטימיזר P1100	מ'ס סטרינגים	סוג ממיר
134.59%	33.3	44.82	28	14	3	SolarEdge 33.3kW
			28	14		
			27	14		
134.59%	33.3	44.82	83	42		

DRAWING NUMBER:

Aliyot School - G004

Client:

שחר אנרגיה

Site location:

רמת גן

לאישור

לביצוע

ASMADE

Date:

21/12/21

Print Size:

A3

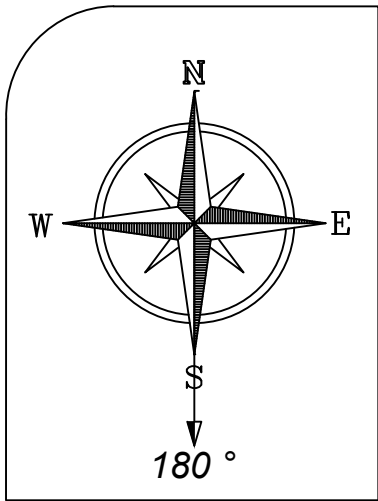
Designer:

Roi N.

TITLE:

תכנית חד קוויית

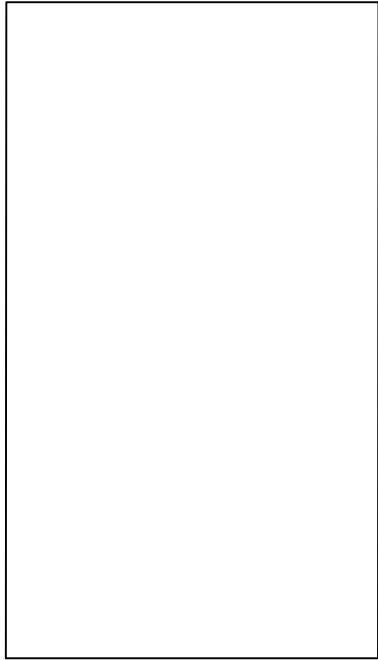




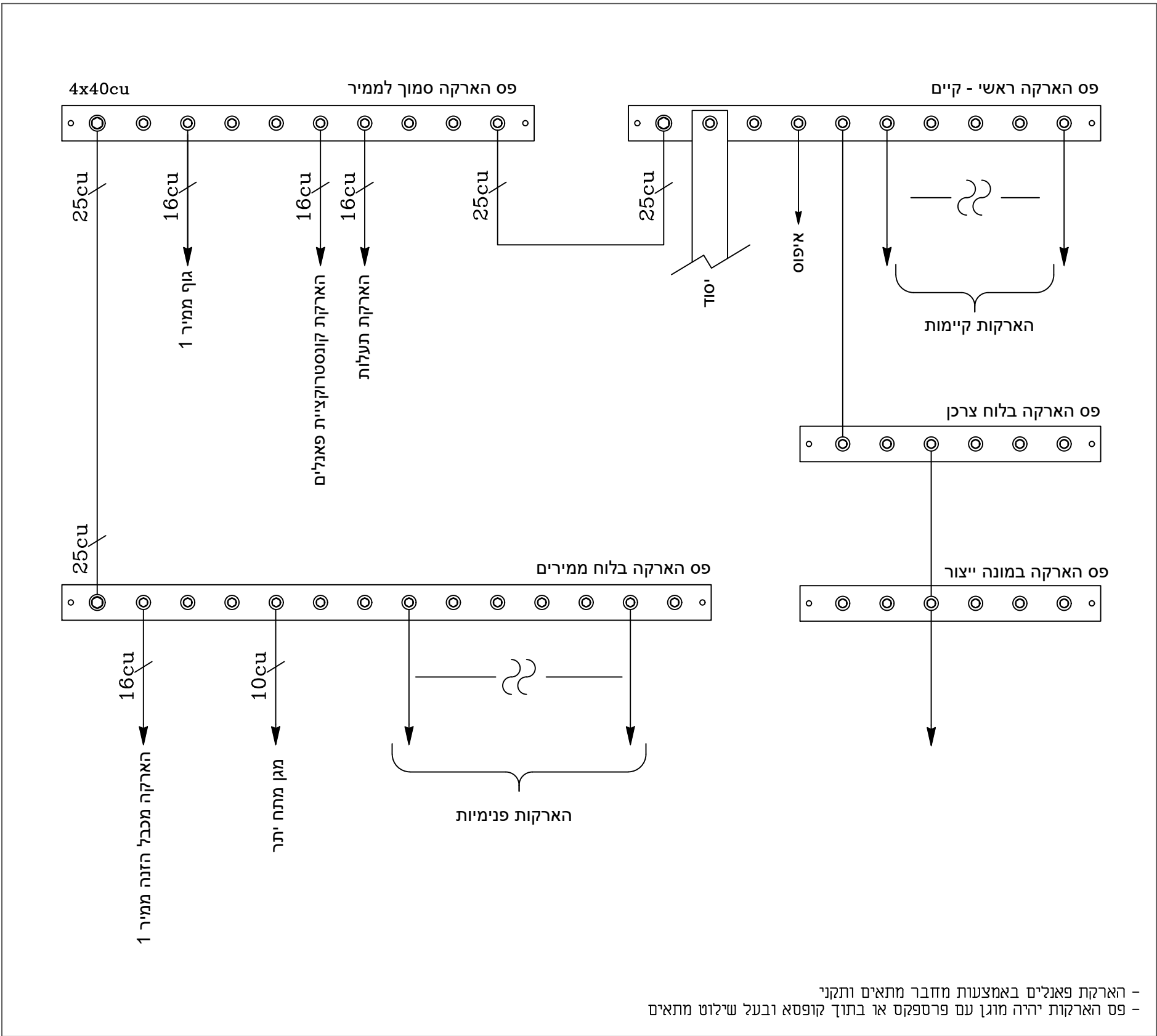
ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters		Quant'
Type :1	SolarEdge33.3kW	1
Type :2	----	----
T.Power:	33.3kVA	

Panels	
Manuf:'	Chint [2256x1133x35]
Model:	540W
Quant:'	83
Tilt:	15°
Azimuth:	180°
T.Power:	44.82kWp



Comments	
###	###
###	

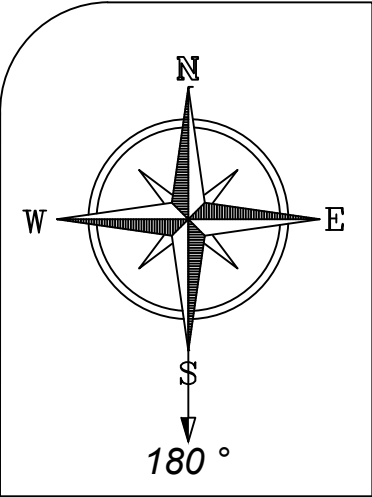


Notes:

1. Elec. panel should be compatible with IL elec. norm 61439
2. Cables, cores, ducts & modules should be marked with proper marking
3. Live elec. contacts must be insulated



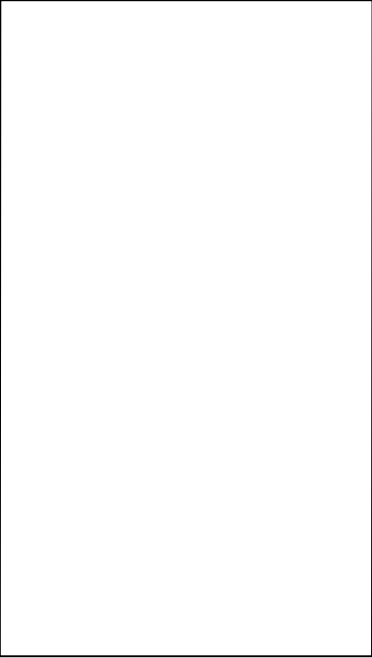
DRAWING NUMBER:		Aliyot School - G005		☒ לאישור ☐ לביצוע ☐ ASMADE			TITLE: תכנית הארקות
Client:		Site location:		Date:	Print Size:	Designer:	
שחר אנרגיה		רמת גן		21/12/21	A3	Roi N.	



ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters	Quant'
Type :1 SolarEdge33.3kW	1
Type :2 -----	-----
T.Power:	33.3kVA

Pannels	
Manuf:'	Chint [2256x1133x35]
Model:	540W
Quant:'	83
Tilt:	15°
Azimuth:	180°
T.Power:	44.82kWp



Comments	
###	###

DATA		Cable Calculation								Production Losses	
Module Type	540	mm^2	Copper			Aluminum				Grid Load	100%
Imp [A]	12.93		4	6	10	25	35	50	70	Power Losses	0.19%
Vmp [V]	41.76										
Module amount	83	Length	0	140	0	0	0	0	0		84W
otal Power [kWp]	44,820										

Inverter	Module No'	Parallel Strings	Power [W]	Current [A]	Max Current Carrying Capacity [A]	Resistance [Ω/1000m]	No' Cable Sets	Cross section [mm^2]	Cable Lenght [M]	Voltage Drop [V]	Power losses [W]	ΔP %	
INV-01	83		44820										
ST-1	28	1	15120	12.93	21.50	3.59	1	6	20	1.9	24.01	0.16%	String Losses
ST-2	28	1	15120	12.93	21.50	3.59	1	6	25	2.3	30.01	0.20%	String Losses
ST-3	27	1	14580	12.93	21.50	3.59	1	6	25	2.3	30.01	0.21%	String Losses
											84.02	0.19%	Total Losses
			44,820	TOTAL							84	0.19%	TOTAL

DRAWING NUMBER: Aliyot School - G007

Client: שחר אנרגיה

Site location: רמת גן

Date: 21/12/21

Print Size: A3

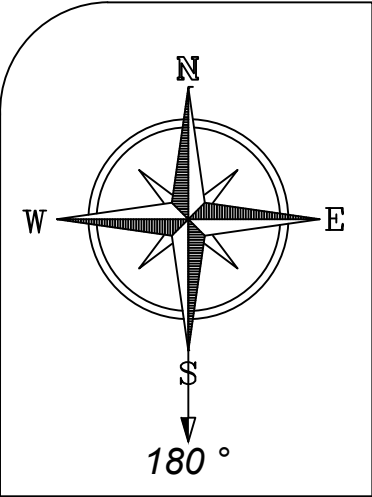
Designer: Roi N.

☒ לאישור

☐ לביצוע

☐ ASMADE

TITLE: הפסדי הולכה DC



ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters	Quant'
Type :1	SolarEdge33.3kW1
Type :2	-----
T.Power:	33.3kVA

Panels	
Manuf:'	Chint [2256x1133x35]
Model:	540W
Quant:'	83
Tilt:	15°
Azimuth:	180°
T.Power:	44.82kWp

Comments	
###	###

DATA							AC CABLE CALCULATION & POWER LOSSES													Production Losses														
Module Type	540	Voltage [V]		400																Avg' Voltage Drop	1.10%													
Imp [A]	12.93	Load [%]		100%																Max Voltage Drop	1.17%													
Vmp [V]	41.76	Cos Ph		1																Power Losses	1.16%													
Module amount	83	Total Power [kVA]		33.30																	387.84W													
Total Power [kWp]	44,820																																	
FROM	TO	Module amount DC	DC Power [kW]	AC Power [kVA]	MAX AC Current [A]	Cable Length [m]	Cable Type		Cross Section [mm^2]	No' Cable sets	Installation type	K1	K2	K3	K4	Max Current Carrying Capacity [A]	R (at cable temp.) [Ω/Km]	Z (impedance) [Ω/Km]	ΔU Cable [V]	Power Losses [W]	ΔU Cable [%]	ΔU AC Line [%]	Power Losses [W]											
											Ambient Temp'	No' Cable sets	No' Cables in Conduit	Thermal resistance (W/km)																				
INV-01	LVP	83	44.8	33.30	48.06	5	4x16 N2XY	Copper	16	1	Air	1	1	1	1	73.0	1.218	1.221	0.51	42.2	0.13%	1.17%	0.13%											
LVP	IEC Meter	83	44.8	33.30	48.06	40	4x25 NA2XY	Aluminum	25	1	Air	1	1	1	1	73.0	1.247	1.250	4.16	345.6	1.04%	1.04%	1.04%											
AC [kVA]	33.30																				387.8	Total Losses		1.16%										

DRAWING NUMBER:

Aliyot School - G008

Client:

שחר אנרגיה

Site location:

רמת גן

☒ לאישור

☐ לביצוע

☐ ASMADE

Date:

21/12/21

Print Size:

A3

Designer:

Roi N.

TITLE:

הפסדי הולכה AC

PVsyst - Simulation report

Grid-Connected System

Project: SHR - RamatGan- Aliyot school

Variant: New simulation variant

Tables on a building

System power: 45.4 kWp

Ramat Yitzhak - Israel



Project: SHR - RamatGan- Aliyot school

Variant: New simulation variant

PVsyst V7.2.2

VCO, Simulation date:
21/12/21 15:15
with v7.2.2

Project summary

Geographical Site

Ramat Yitzhak

Israel

Situation

Latitude 32.07 °N

Longitude 34.83 °E

Altitude 52 m

Time zone UTC+2

Project settings

Albedo 0.20

Meteo data

Ramat Yitzhak

Meteonorm 8.0 (1991-2010), Sat=100% - Synthetic

System summary

Grid-Connected System

PV Field Orientation

Fixed plane

Tilt/Azimuth 15 / 3 °

Tables on a building

Near Shadings

According to strings

Electrical effect 100 %

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules 84 units

Pnom total 45.4 kWp

Inverters

Nb. of units 1 Unit

Pnom total 33.3 kWac

Pnom ratio 1.362

Results summary

Produced Energy 75.17 MWh/year Specific production 1657 kWh/kWp/year Perf. Ratio PR 82.66 %

Table of contents

Project and results summary	2
General parameters, PV Array Characteristics, System losses	3
Near shading definition - Iso-shadings diagram	6
Main results	7
Loss diagram	8
Special graphs	9



Project: SHR - RamatGan- Aliyot school

Variant: New simulation variant

PVsyst V7.2.2

VC0, Simulation date:
21/12/21 15:15
with v7.2.2

General parameters

Grid-Connected System

PV Field Orientation

Orientation

Fixed plane
Tilt/Azimuth 15 / 3 °

Horizon

Free Horizon

Tables on a building

Sheds configuration

Nb. of sheds 3 units

Sizes

Sheds spacing 5.43 m
Collector width 3.61 m
Ground Cov. Ratio (GCR) 66.5 %

Shading limit angle

Limit profile angle 25.7 °

Near Shadings

According to strings
Electrical effect 100 %

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer Longi Solar
Model LR5-72 HPH 540 M

(Original PVsyst database)

Unit Nom. Power 540 Wp
Number of PV modules 84 units
Nominal (STC) 45.4 kWp
Optimizer Array 3 Strings x 14 In series

At operating cond. (50°C)

Pmpp 41.5 kWp
Output of optimizers
Voper 750 V
I at Poper 55 A

SolarEdge Power Optimizer

Model P1100 Worldwide
Unit Nom. Power 1100 W
Modules 1 String x 2 in series

Total PV power

Nominal (STC) 45 kWp
Total 84 modules
Module area 215 m²
Cell area 195 m²

Inverter

Manufacturer SolarEdge
Model SE33.3K-EU-APAC/AUS (400V)

(Original PVsyst database)

Unit Nom. Power 33.3 kWac
Number of inverters 1 Unit
Total power 33.3 kWac
Operating voltage 750 V
Pnom ratio (DC:AC) 1.28

Total inverter power

Total power 33 kWac
Nb. of inverters 1 Unit
Pnom ratio 1.36

Array losses

Array Soiling Losses

Loss Fraction 3.0 %

Thermal Loss factor

Module temperature according to irradiance
Uc (const) 27.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

DC wiring losses

Global array res. 124 mΩ
Loss Fraction 1.0 % at STC

LID - Light Induced Degradation

Loss Fraction 2.0 %

Module Quality Loss

Loss Fraction -0.4 %

Module mismatch losses

Loss Fraction (Fixed voltage) 0.0 %



PVsyst V7.2.2

VC0, Simulation date:
21/12/21 15:15
with v7.2.2

Array losses

IAM loss factor

Incidence effect (IAM): User defined profile

0°	25°	45°	60°	65°	70°	75°	80°	90°
1.000	1.000	0.995	0.962	0.936	0.903	0.851	0.754	0.000



PVsyst V7.2.2

VC0, Simulation date:

21/12/21 15:15

with v7.2.2

System losses

Unavailability of the system

Time fraction	0.5 %
	1.8 days,
	3 periods

AC wiring losses

Inv. output line up to injection point

Inverter voltage	400 Vac tri
Loss Fraction	1.00 % at STC

Inverter: SE33.3K-EU-APAC/AUS (400V)

Wire section (1 Inv.)	Copper 1 x 3 x 16 mm ²
Wires length	31 m

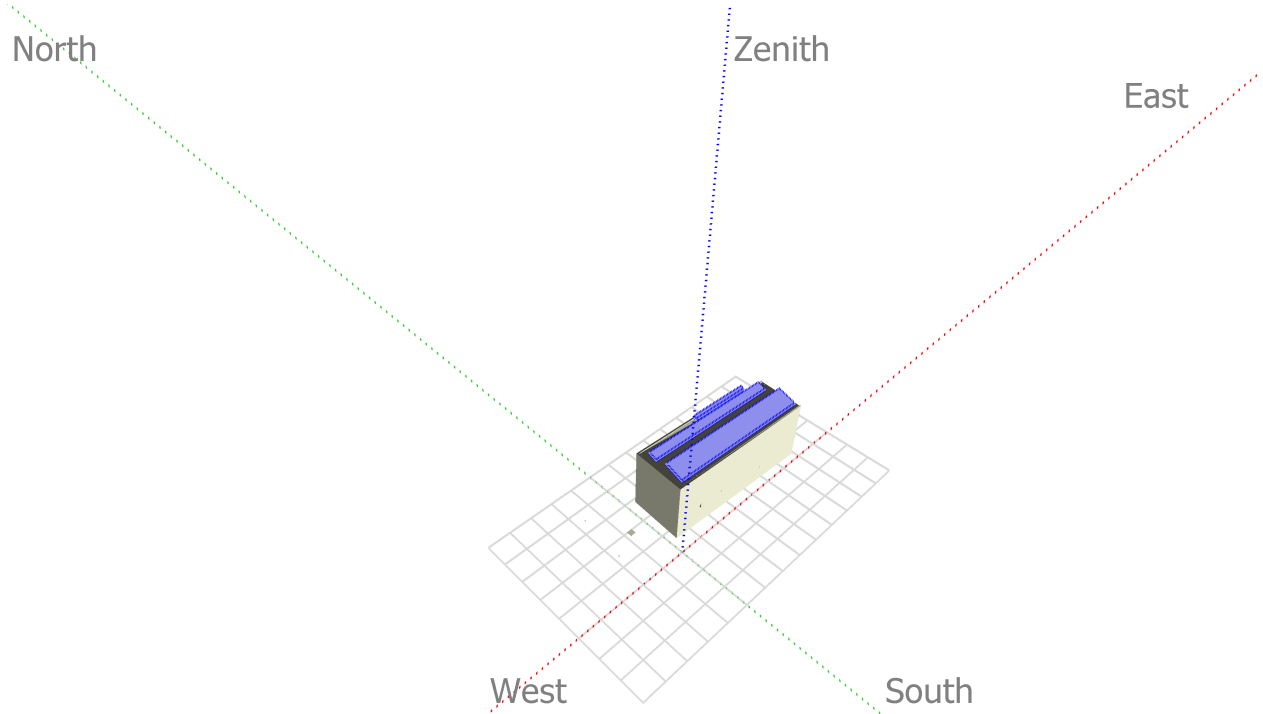


PVsyst V7.2.2

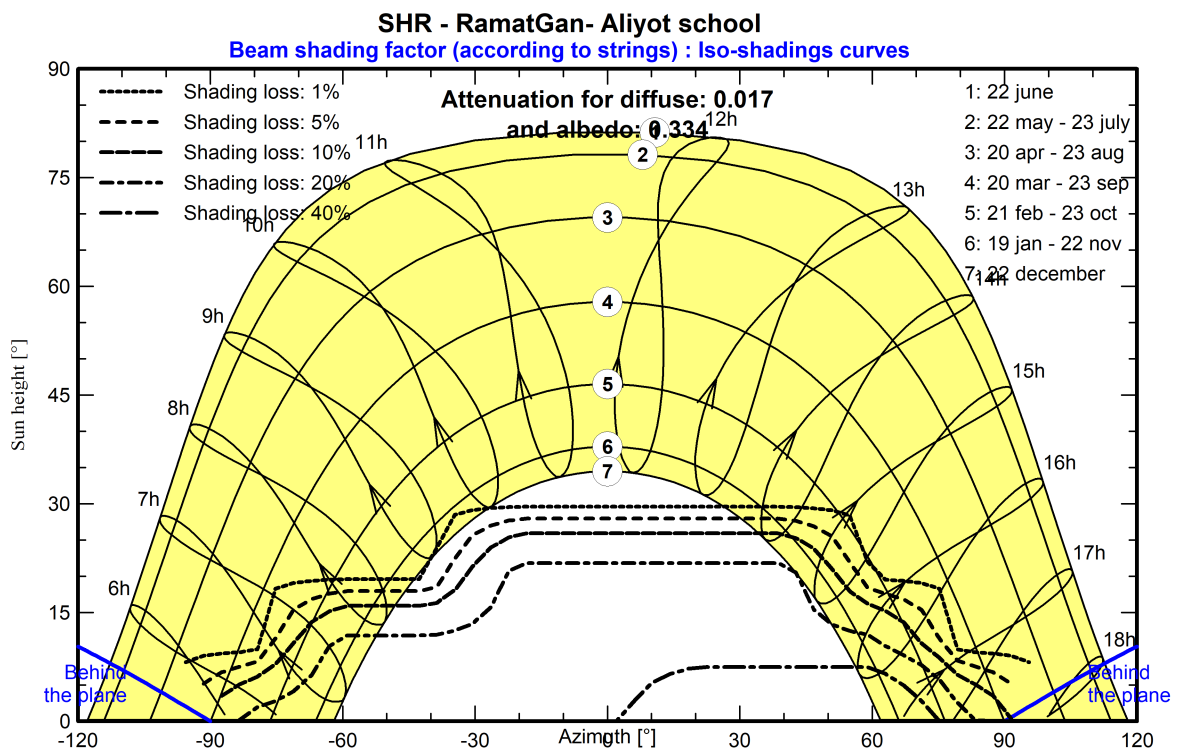
VC0, Simulation date:
21/12/21 15:15
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Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram





Project: SHR - RamatGan- Aliyot school

Variant: New simulation variant

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VC0, Simulation date:
21/12/21 15:15
with v7.2.2

Main results

System Production

Produced Energy

75.17 MWh/year

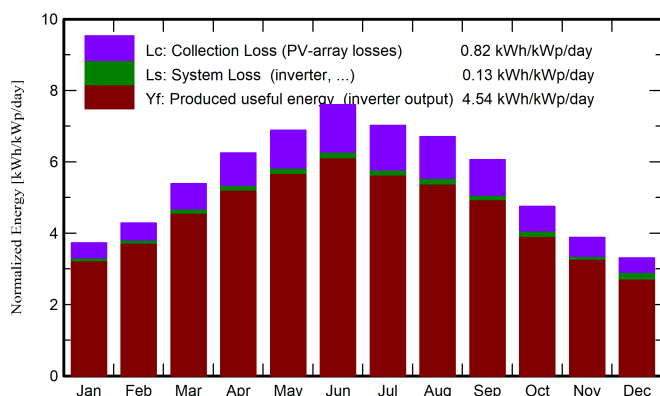
Specific production

1657 kWh/kWp/year

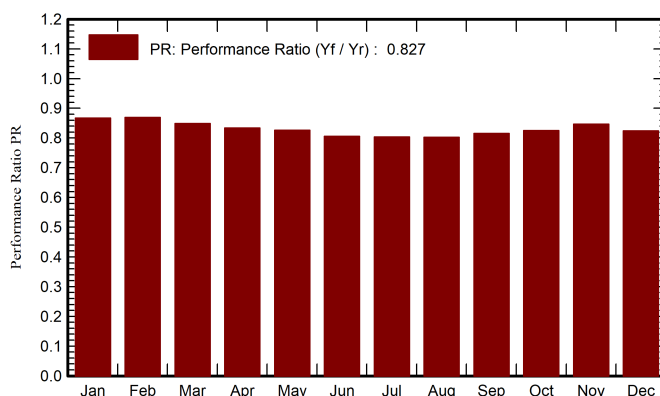
Performance Ratio PR

82.66 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m ²	kWh/m ²	°C	kWh/m ²	kWh/m ²	MWh	MWh	ratio
January	91.4	39.20	12.88	115.7	108.6	4.663	4.552	0.867
February	101.2	45.53	14.04	120.0	113.4	4.850	4.733	0.870
March	150.9	67.04	16.79	166.9	158.3	6.592	6.429	0.849
April	178.2	75.95	19.34	187.6	177.9	7.278	7.096	0.834
May	213.5	86.63	22.90	213.4	202.1	8.201	7.995	0.826
June	233.3	69.50	25.63	228.0	216.3	8.548	8.330	0.805
July	220.9	77.49	28.34	217.6	206.1	8.134	7.930	0.804
August	201.6	74.67	28.94	207.8	197.2	7.807	7.569	0.803
September	166.3	58.97	26.82	181.9	172.6	6.899	6.727	0.815
October	127.8	59.25	23.98	147.2	139.2	5.721	5.510	0.825
November	93.6	37.44	19.13	116.3	109.6	4.576	4.467	0.847
December	81.0	40.24	15.10	102.4	95.7	4.092	3.828	0.824
Year	1859.7	731.91	21.20	2004.7	1897.0	77.361	75.165	0.827

Legends

GlobHor Global horizontal irradiation

DiffHor Horizontal diffuse irradiation

T_Amb Ambient Temperature

GlobInc Global incident in coll. plane

GlobEff Effective Global, corr. for IAM and shadings

EArray Effective energy at the output of the array

E_Grid Energy injected into grid

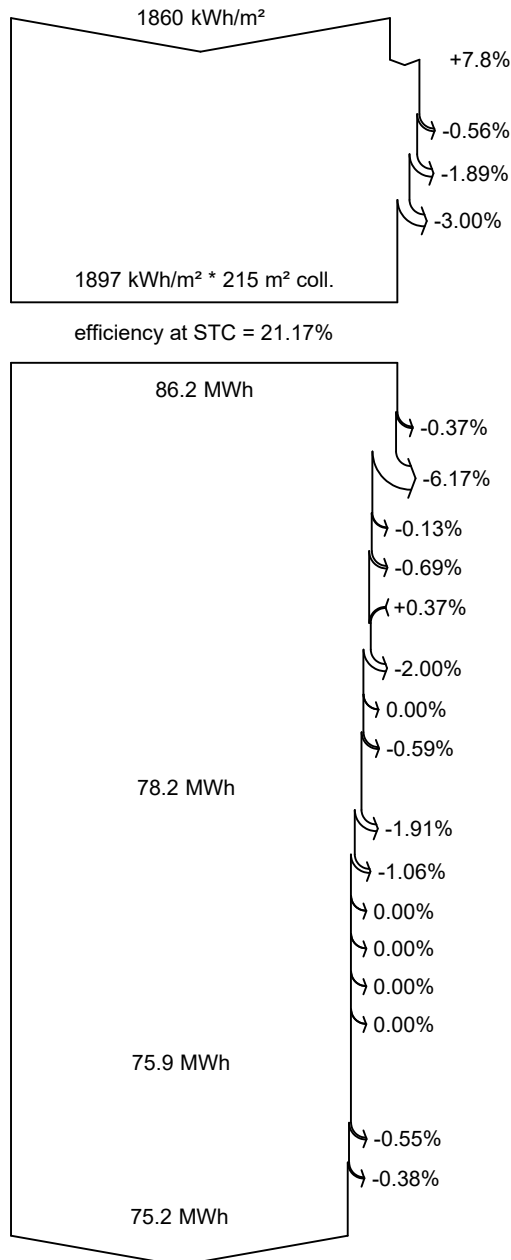
PR Performance Ratio



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VC0, Simulation date:
21/12/21 15:15
with v7.2.2

Loss diagram



Global horizontal irradiation

Global incident in coll. plane

Near Shadings: irradiance loss

IAM factor on global

Soiling loss factor

Effective irradiation on collectors

PV conversion

Array nominal energy (at STC effic.)

PV loss due to irradiance level

PV loss due to temperature

Shadings: Electrical Loss acc. to strings

Optimizer efficiency loss

Module quality loss

LID - Light induced degradation

Module array mismatch loss

Ohmic wiring loss

Array virtual energy at MPP

Inverter Loss during operation (efficiency)

Inverter Loss over nominal inv. power

Inverter Loss due to max. input current

Inverter Loss over nominal inv. voltage

Inverter Loss due to power threshold

Inverter Loss due to voltage threshold

Available Energy at Inverter Output

AC ohmic loss

System unavailability

Energy injected into grid

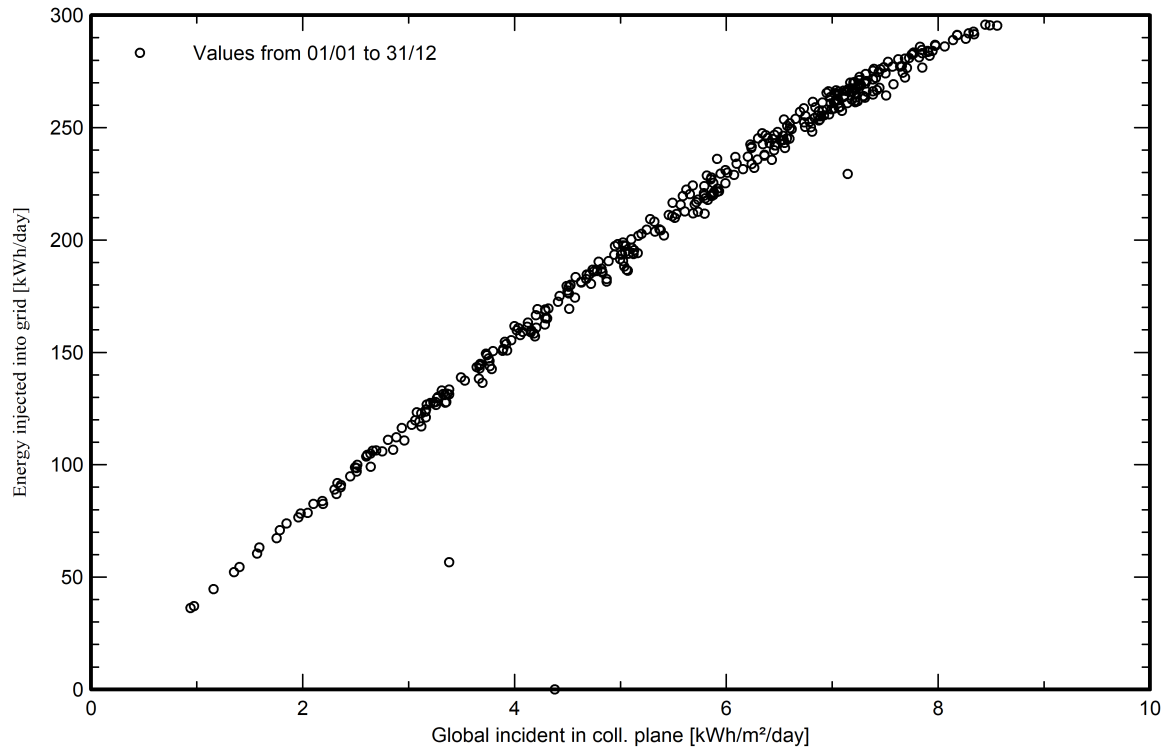


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21/12/21 15:15
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Special graphs

Daily Input/Output diagram



System Output Power Distribution

