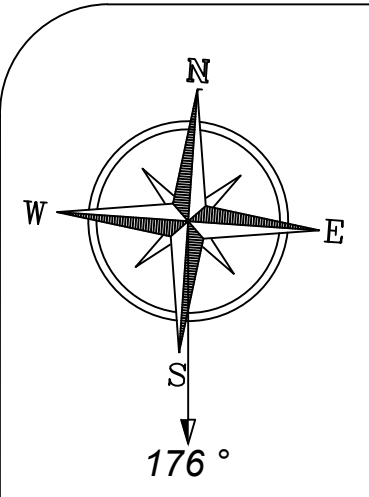




**ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות**

Inverters		Quant'
Type :1	SolarEdge 50kW[45kW]	1
Type :2	----	----
T.Power:	45kVA	

Panels	
Manuf:'	Chint [2256x1133x35]
Model:	540W
Quant:'	95
Tilt:	12°
Azimuth:	176°
T.Power:	51.3kWp

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



DRAWING NUMBER: **Moreshet Moshe - G000**

Client: **שחר אנרגיה**

Site location: **רמת גן**

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לביצוע

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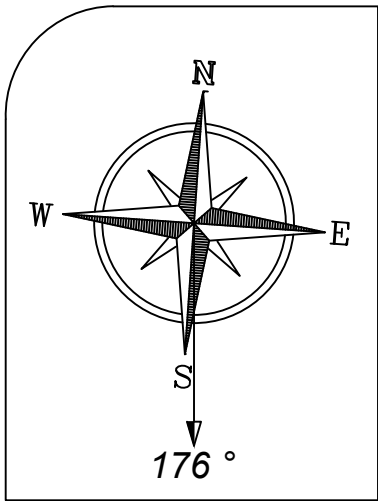
TITLE:

Date: 08/03/22

Print Size:	A3
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Designer: **Roi N.**

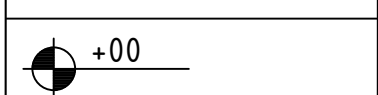
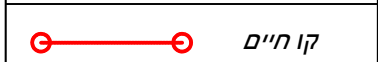
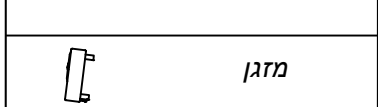
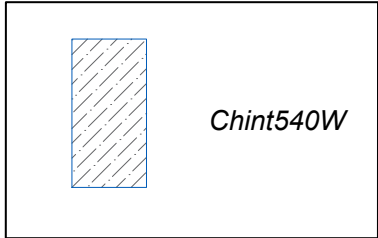
רשימת תכניות



ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

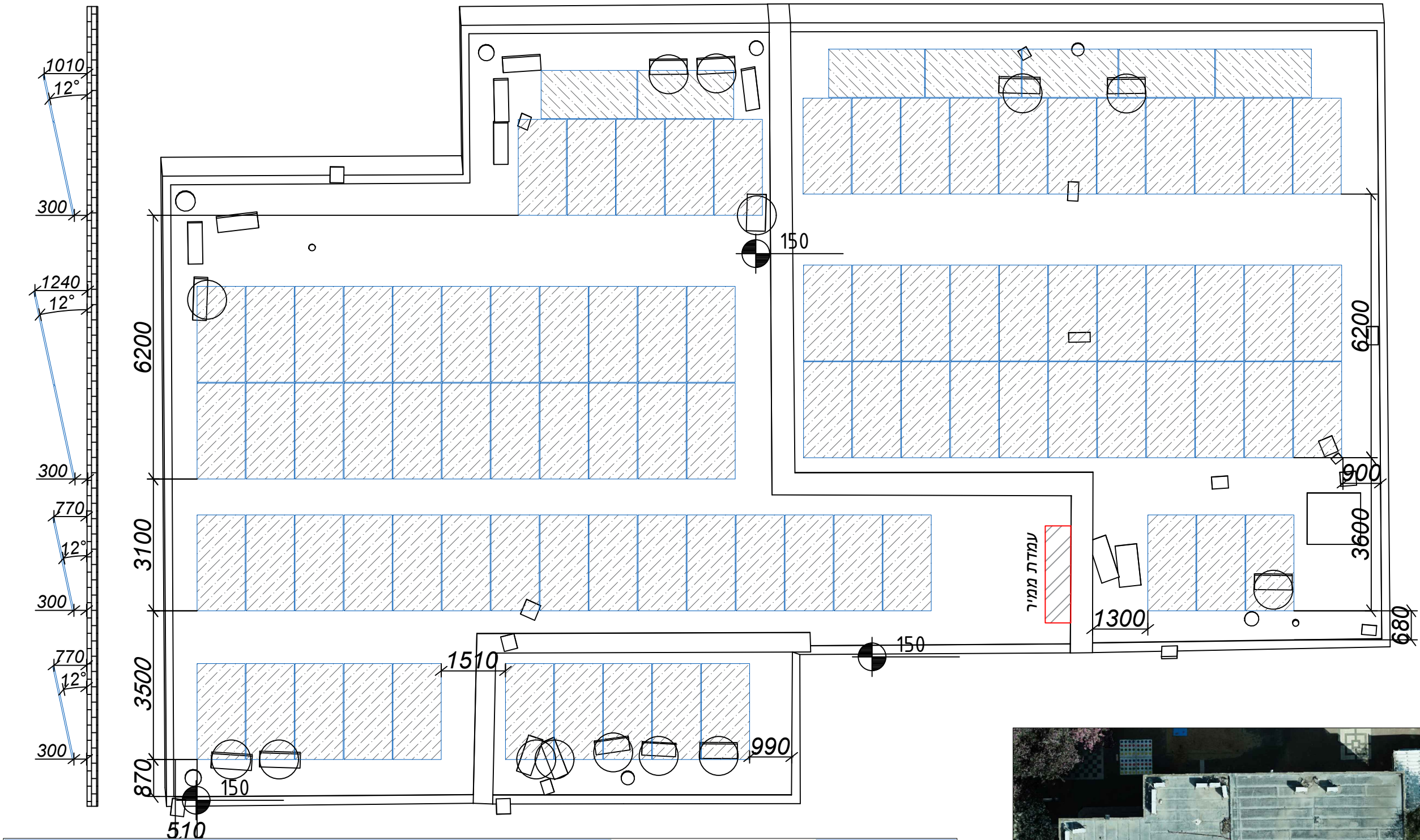
Inverters	Quant'
Type :1 SolarEdge 50kW[45kW]	1
Type :2 -----	-----
T.Power:	45kVA

Panels	
Manuf:' Chint [2256x1133x35]	
Model: 540W	
Quant:' 95	
Tilt: 12°	
Azimuth: 176°	
T.Power: 51.3kWp	



Comments

###	###
###	



מורשת משה, רמת גן - חלוקה לסטרינגים						540		הספק פאנל [W] :	
						95		כמות פאנלים :	
						45		הספק AC [kW] :	
						51.3		הספק DC [kWp] :	
						114.00%		יחס העמסה AC/DC :	
AC/DC	[kW] AC	הספק [kWp] DC	מ'ס פאנלים	אופטימיזר P1100	מ'ס סטרינגים	Unit	סוג ממיר	ממיר	סוג גג
114.00%	45	51.3	34	17	2	Center	SolarEdge 50kW	1	בטון
			32	16					
			29	15					
114.00%	45	51.3	95	48	סה"כ כמות:				



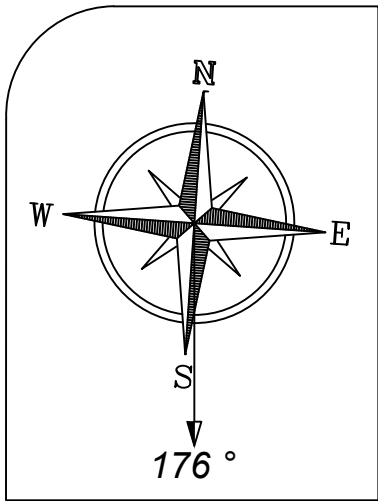
DRAWING NUMBER: **Moreshet Moshe - G001**

Client: **שחר אנרגיה** Site location: **רמת גן**

☐ לאישור ☒ לביצוע ☐ ASMADE

Date: **08/03/22** Print Size: **A3** Designer: **Roi N.**

TITLE: **הצבת פאנלים**



ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

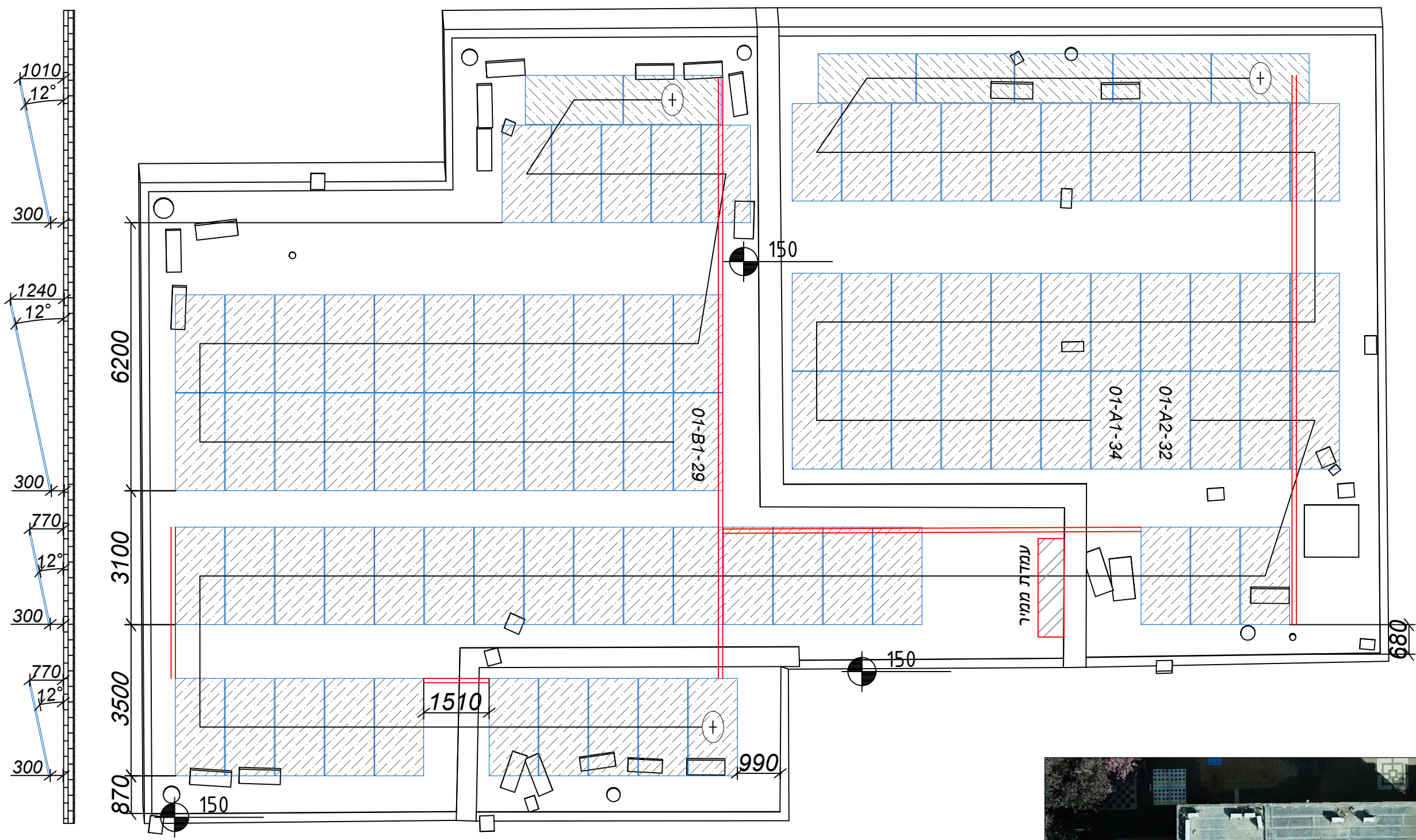
Inverters	Quant'
Type :1 SolarEdge 50kW[45kW]	1
Type :2 -----	-----
T.Power:	45kVA

Panels	
Manuf:' Chint [2256x1133x35]	
Model: 540W	
Quant': 95	
Tilt: 12°	
Azimuth: 176°	
T.Power: 51.3kWp	

מקרא חיווט:

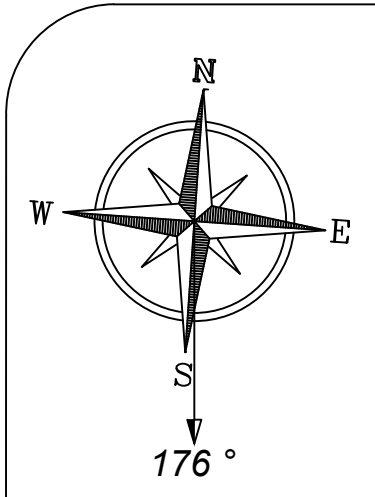
XX-YY-ZZ
XX - מספר ממיר
YY - mppt כניסת
ZZ - כמות פאנלים
+ כיוון חיבור סטרינג
01-A קופסת איסוף סטרינג
== תעלת רשת DC

Comments	###
###	



מורשת משה, רמת גן - חלוקה לסטרינגים						540	הספק פאנל [W]
						95	כמות פאנלים
						45	הספק AC [kW]
						51.3	הספק DC [kWp]
						114.00%	יחס העמסה AC/DC
AC/DC	[kW] AC	[kWp] DC	הספק	מ'ס פאנלים	אופטימיזר P1100	Unit	סוג ממיר
114.00%	45	51.3	34	17	2	Center	SolarEdge 50kW
			32	16			
			29	15	1	Left	
114.00%	45	51.3	95	48			סה"כ כמות:

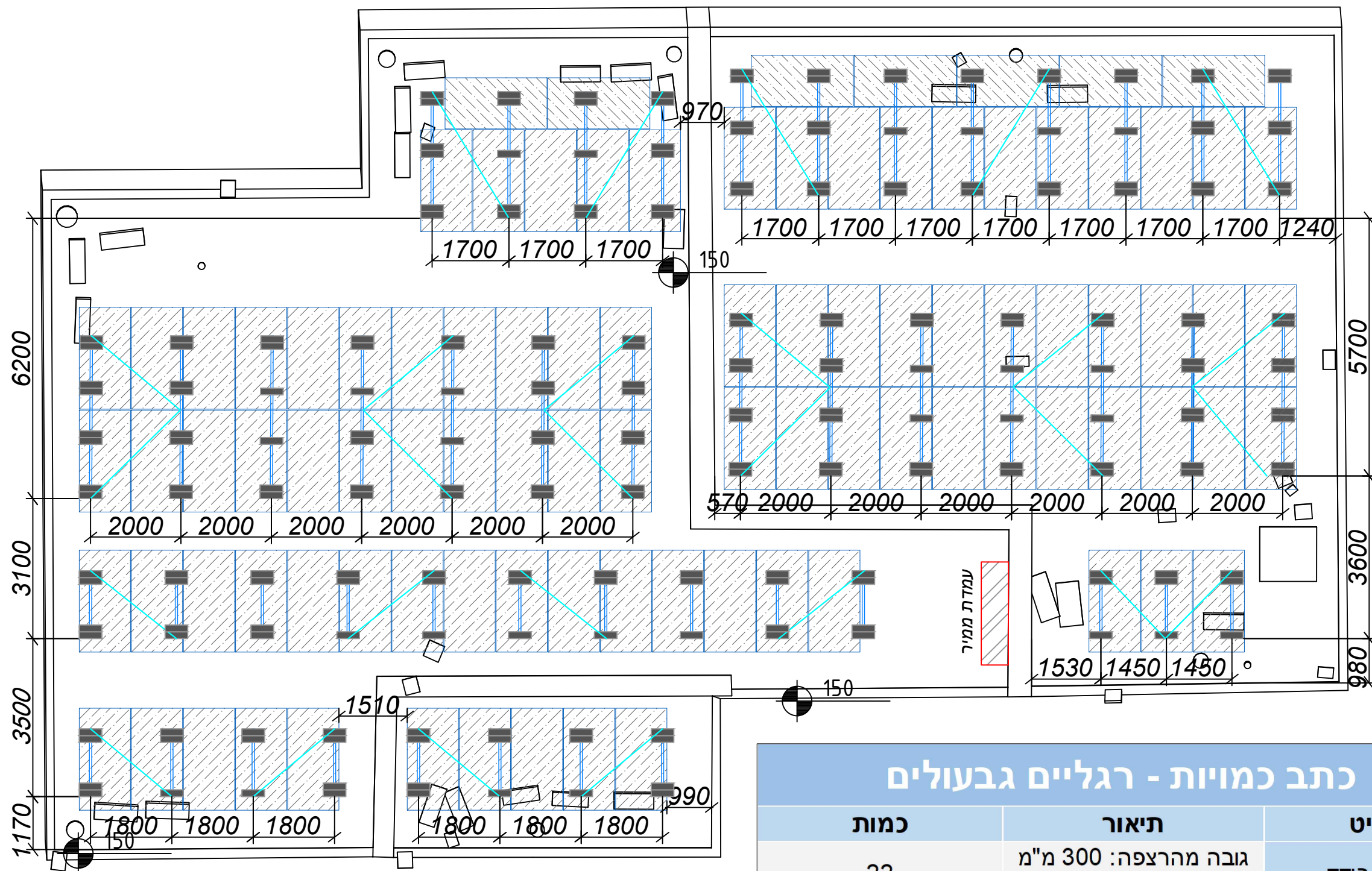
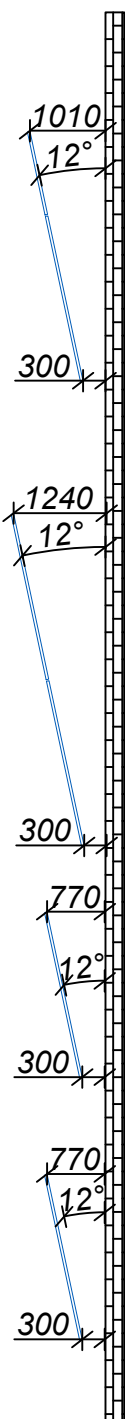




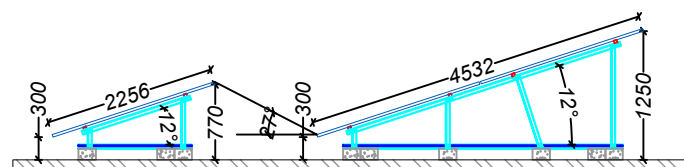
**ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות**

Inverters		Quant'
Type :1	SolarEdge 50kW[45kW]	1
Type :2	-----	-----
T.Power:	45kVA	

Panels	
Manuf.:	Chint [2256x1133x35]
Model:	540W
Quant.:	95
Tilt:	12°
Azimuth:	176°
T.Power:	51.3kWp



פרט התקנת קונסטרוקציה



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

כתב כמויות - רגליים גבעולים

כמות	תיאור	פריט
22	גובה מהרצפה: 300 מ"מ זווית: 12°	פאנל בודד
14	גובה מהרצפה: 300 מ"מ זווית: 12°	פאנל כפול
12	גובה מהרצפה: 300 מ"מ זווית: 12°	פאנל בודד וחצי
27	אורך 2.3 מ	דיאגונל
243	39 ק"ג גובה: 150, רוחב: 230, אורך: 500	אבנים



DRAWING NUMBER: **Moreshet Moshe - G003**

Client: **שחר אנרגיה**

Site location: **רמת גן**

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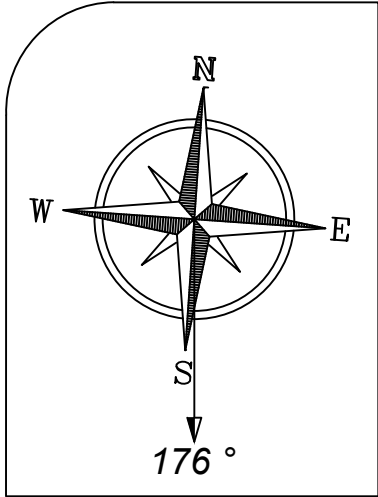
Date: 08/03/22

Print Size:
A3

Designer: **Roi N.**

TITLE:

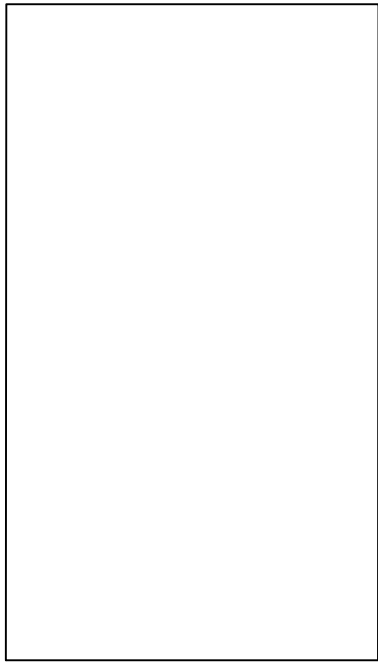
קונסטרוקציה



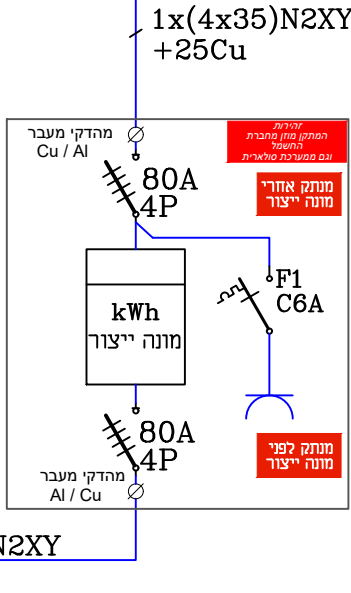
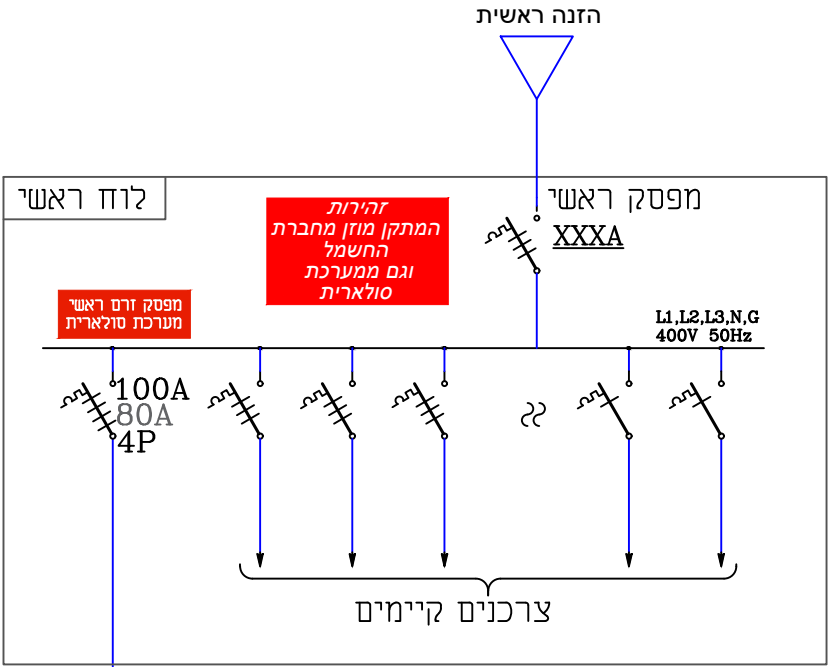
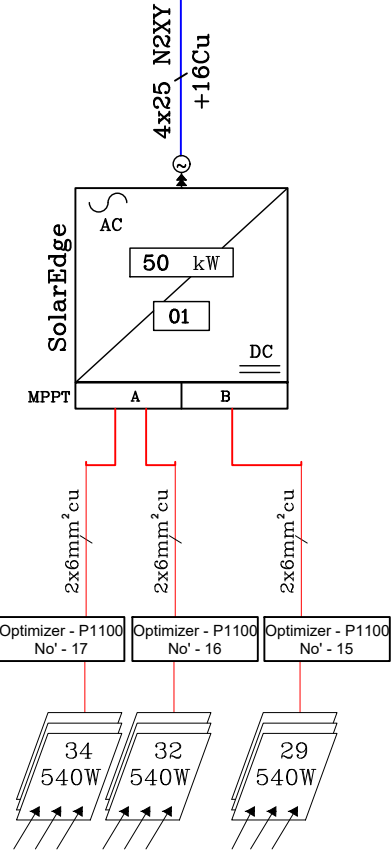
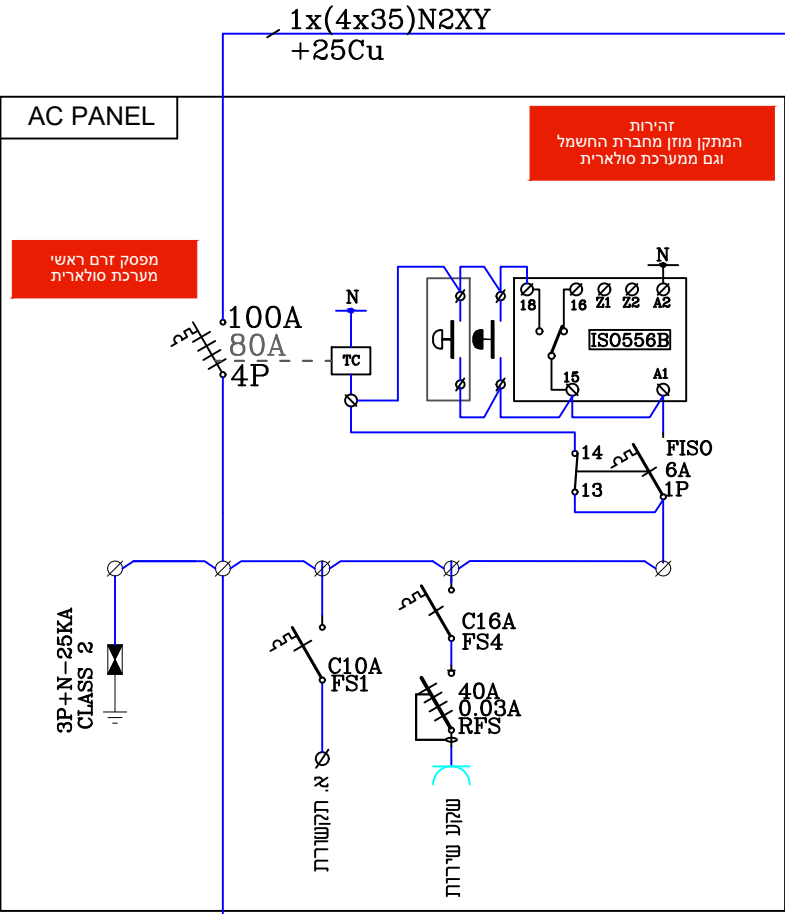
ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters	Quant'
Type :1 SolarEdge 50kW[45kW]	1
Type :2 -----	-----
T.Power:	45kVA

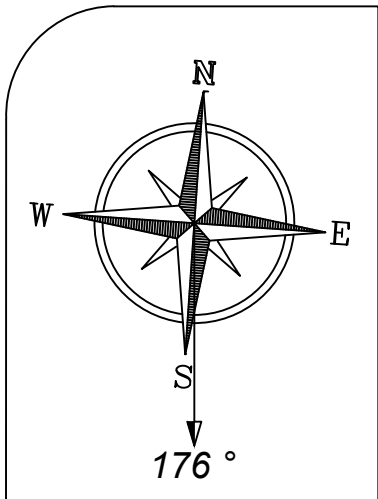
Panels	
Manuf:' Chint [2256x1133x35]	
Model: 540W	
Quant:' 95	
Tilt: 12°	
Azimuth: 176°	
T.Power: 51.3kWp	



Comments	###
###	



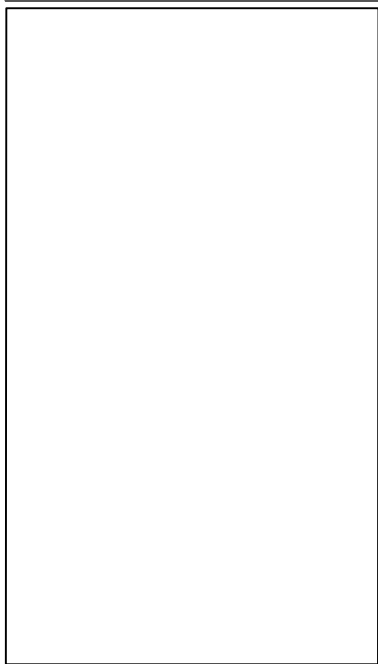
מורשת משה, רמת גן - חלוקה לסטרינגים						540		הספק פאנל [W] :	
						95		כמות פאנלים :	
						45		הספק AC [kW] :	
						51.3		הספק DC [kWp] :	
						114.00%		יחס העמסה AC/DC :	
AC/DC	הספק AC [kW]	הספק DC [kWp]	מ'ס פאנלים	אופטימיזר P1100	מ'ס סטרינגים	Unit	סוג ממיר	ממיר	סוג גג
114.00%	45	51.3	34	17	2	Center	SolarEdge 50kW	1	בטון
			32	16					
			29	15					
114.00%	45	51.3	95	48	סה"כ כמות:				



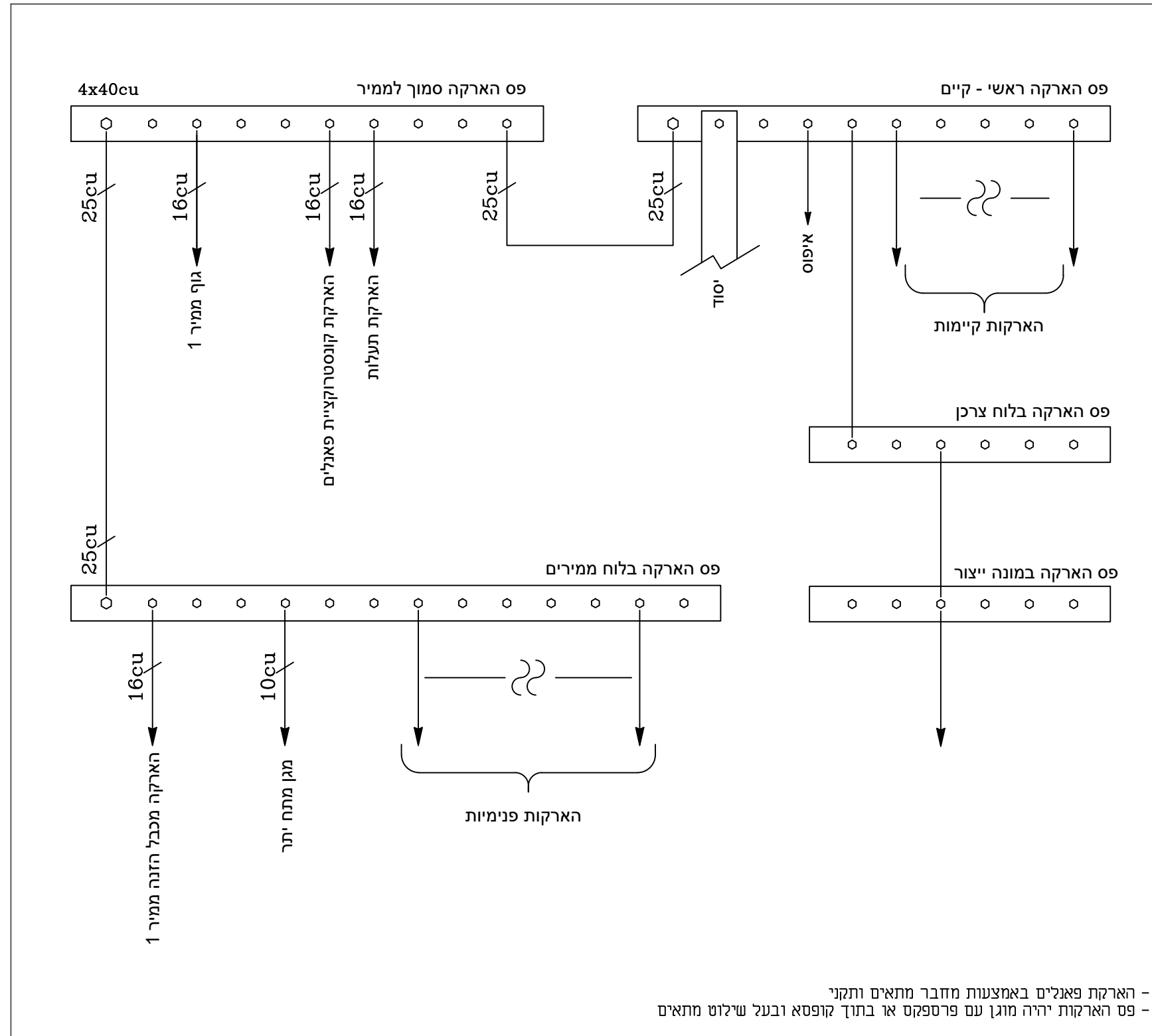
ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters	Quant'
Type :1 SolarEdge 50kW[45kW]	1
Type :2 ----	----
T.Power:	45kVA

Panels	
Manuf:' Chint [2256x1133x35]	
Model:	540W
Quant:'	95
Tilt:	12°
Azimuth:	176°
T.Power:	51.3kWp



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: **Moreshet Moshe - G005**

Client: **שחר אנרגיה**

Site location: **רמת גן**

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☒ לביצוע

☐ ASMADE

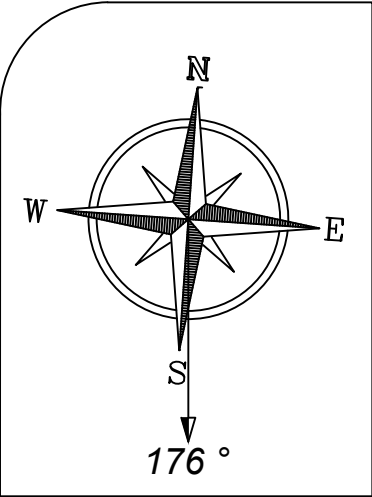
Date: **08/03/22**

Print Size: **A3**

Designer: **Roi N.**

TITLE:

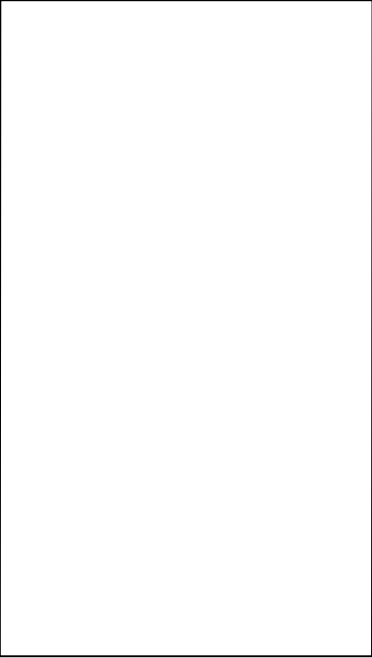
תכנית הארקות



ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters	Quant'
Type :1	SolarEdge 50kW[45kW] 1
Type :2	-----
T.Power:	45kVA

Panels	
Manuf:'	Chint [2256x1133x35]
Model:	540W
Quant:'	95
Tilt:	12°
Azimuth:	176°
T.Power:	51.3kWp

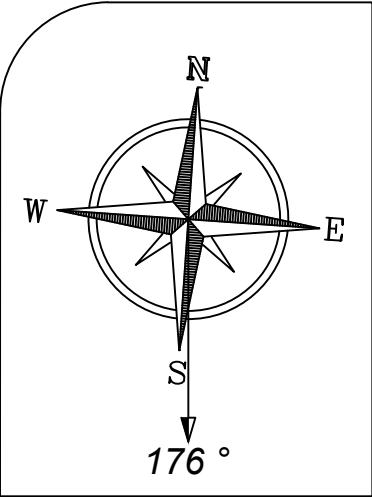


Comments	
###	###

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	0.16%
Vmp [V]	41.76										
Module amount	95	Length	0	140	0	0	0	0	0		84W
Total Power [kWp]	51,300										

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 Lenth [M]	Voltage Drop [V]	Power losses [W]	ΔP %	
INV-01	95		51300										
ST-1	34	1	18360	12.93	21.50	3.59	1	6	25	2.3	30.01	0.16%	String Losses
ST-2	32	1	17280	12.93	21.50	3.59	1	6	20	1.9	24.01	0.14%	String Losses
ST-3	29	1	15660	12.93	21.50	3.59	1	6	25	2.3	30.01	0.19%	String Losses
			51,300	TOTAL							84.02	0.16%	Total Losses
											84	0.16%	TOTAL

	DRAWING NUMBER: Moreshet Moshe - G007		☐ לאישור ☒ לביצוע ☐ ASMADE			TITLE: הפסדי הולכה DC	
	Client: שחר אנרגיה	Site location: רמת גן	Date: 08/03/22	Print Size: A3	Designer: Roi N.		



ביצוע כל עבודה בכפוף
להוראות ממונה הבטיחות

Inverters	Quant'
Type :1	SolarEdge 50kW[45kW]1
Type :2	-----
T.Power:	45kVA

Panels	
Manuf:'	Chint [2256x1133x35]
Model:	540W
Quant:'	95
Tilt:	12°
Azimuth:	176°
T.Power:	51.3kWp

Comments	
###	###

DATA							AC CABLE CALCULATION & POWER LOSSES														Production Losses														
Module Type	540	Voltage [V]		400																	Avg' Voltage Drop		1.07%												
Imp [A]	12.93	Load [%]		100%																	Max Voltage Drop		1.13%												
Vmp [V]	41.76	Cos Ph		1																	Power Losses		1.12%												
Module amount	95	Total Power [kVA]		45.00																			505.28W												
Total Power [kWp]	51,300																																		
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												
												Ambient Temp'	No' Cable sets	No' Cables in Conduit	Thermal resistance (W/km)																				
INV-01	LVP	95	51.3	45.00	64.95	5	4x25 N2XY	Copper	25	1	Air	1	1	1	1	94.0	0.770	0.775	0.44	48.7	0.11%	1.13%	0.11%												
LVP	IEC Meter	95	51.3	45.00	64.95	40	4x35 NA2XY	Aluminum	35	1	Air	1	1	1	1	87.0	0.902	0.906	4.08	456.6	1.02%	1.02%	1.01%												
AC [kVA]	45.00																			505.3	Total Losses		1.12%												

DRAWING NUMBER: Moreshet Moshe - G008

Client: שחר אנרגיה

Site location: רמת גן

☐ לאישור

☒ לביצוע

☐ ASMADE

Date: 08/03/22

Print Size: A3

Designer: Roi N.

TITLE:

הפסדי הולכה AC

PVsyst - Simulation report

Grid-Connected System

Project: SHR - RamatGan - Moreshet Moshe

Variant: New simulation variant

Tables on a building

System power: 51.8 kWp

Ramat Yitzhak - Israel



Project: SHR - RamatGan - Moreshet Moshe

Variant: New simulation variant

PVsyst V7.2.2

VC0, Simulation date:
08/03/22 16:53
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 Gan

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

System summary

Grid-Connected System

PV Field Orientation

Fixed plane

Tilt/Azimuth 12 / -1 °

Tables on a building

Near Shadings

Linear shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules 96 units

Pnom total 51.8 kWp

Inverters

Nb. of units 2 units

Pnom total 50.0 kWac

Grid power limit 45.0 kWac

Grid lim. Pnom ratio 1.152

Results summary

Produced Energy 85.82 MWh/year Specific production 1656 kWh/kWp/year Perf. Ratio PR 83.42 %

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



PVsyst V7.2.2

VC0, Simulation date:
08/03/22 16:53
with v7.2.2

General parameters

Grid-Connected System

PV Field Orientation

Orientation

Fixed plane
Tilt/Azimuth 12 / -1 °

Horizon

Free Horizon

Grid power limitation

Active Power 45.0 kWac
Pnom ratio 1.152

Tables on a building

Sheds configuration

Nb. of sheds 10 units

Sizes

Sheds spacing 4.17 m
Collector width 3.23 m
Ground Cov. Ratio (GCR) 77.6 %

Shading limit angle

Limit profile angle 33.8 °

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Near Shadings

Linear shadings

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 96 units
Nominal (STC) 51.8 kWp

SolarEdge Power Optimizer

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

Array #1 - PV Array

Number of PV modules 68 units
Nominal (STC) 36.7 kWp
Optimizer Array 2 Strings x 17 In series

At operating cond. (50°C)

Pmpp 33.6 kWp
Output of optimizers
Voper 750 V
I at Poper 45 A

Array #2 - Sub-array #2

Number of PV modules 28 units
Nominal (STC) 15.12 kWp
Optimizer Array 1 String x 14 In series

At operating cond. (50°C)

Pmpp 13.82 kWp
Output of optimizers
Voper 750 V
I at Poper 18 A

Inverter

Manufacturer SolarEdge
Model SE50K/SE75K Unit
(Original PVsyst database)

Unit Nom. Power 25.0 kWac
Number of inverters 2 units
Total power 50.0 kWac

Number of inverters 1.5 units
Total power 35.4 kWac

Operating voltage 750 V
Pnom ratio (DC:AC) 0.95

Number of inverters 0.5 Unit
Total power 14.6 kWac

Operating voltage 750 V
Pnom ratio (DC:AC) 0.95



PVsyst V7.2.2

VC0, Simulation date:
08/03/22 16:53
with v7.2.2

PV Array Characteristics

Total PV power

Nominal (STC)	52 kWp
Total	96 modules
Module area	245 m ²
Cell area	223 m ²

Total inverter power

Total power	50 kWac
Nb. of inverters	2 units
Pnom ratio	1.04



PVsyst V7.2.2

VC0, Simulation date:
08/03/22 16:53
with v7.2.2

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

LID - Light Induced Degradation

Loss Fraction 2.0 %

Module Quality Loss

Loss Fraction -0.8 %

Module mismatch losses

Loss Fraction (Fixed voltage) 0.0 %

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

DC wiring losses

Global wiring resistance 10 mΩ
Loss Fraction 1.1 % at STC

Array #1 - PV Array

Global array res. 153 mΩ
Loss Fraction 1.0 % at STC

Array #2 - Sub-array #2

Global array res. 557 mΩ
Loss Fraction 1.5 % at STC

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 0.80 % at STC

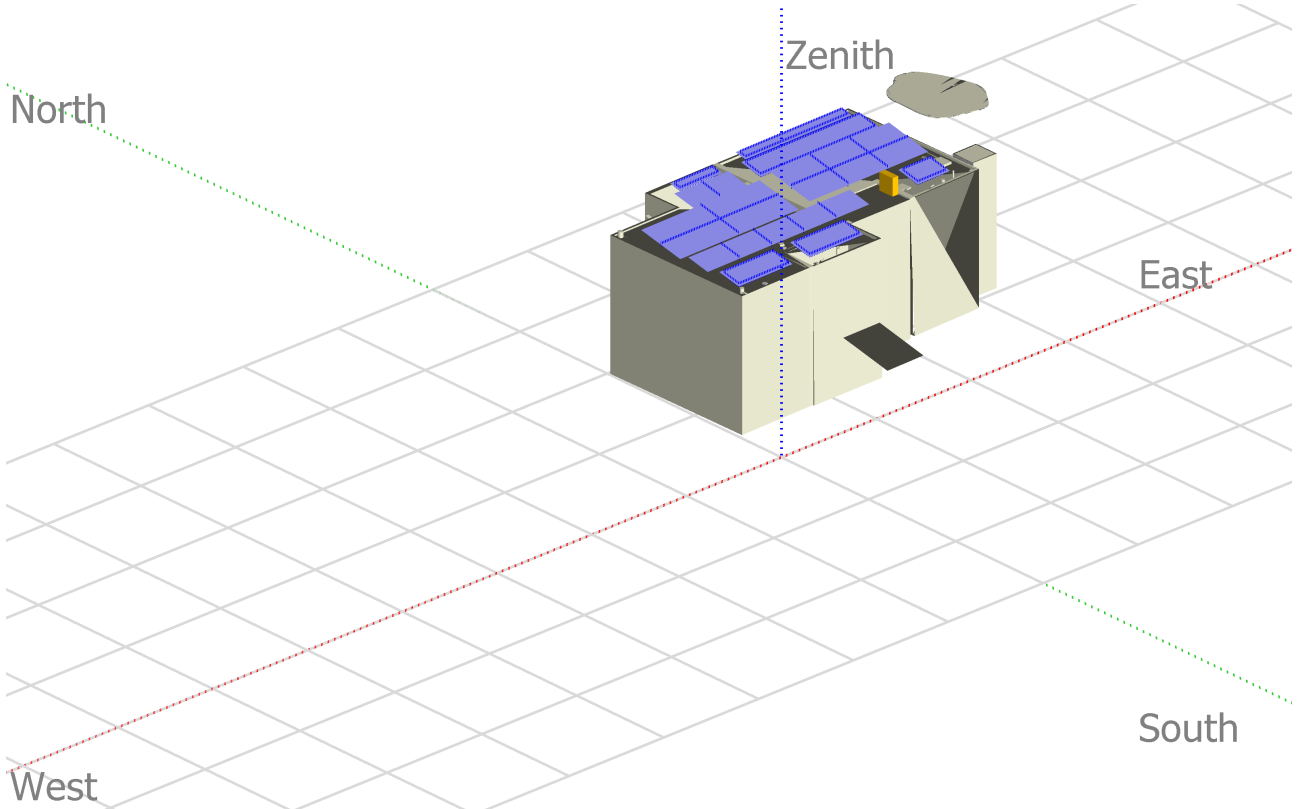
Global System

Wire section Copper 3 x 25 mm²
Wires length 34 m

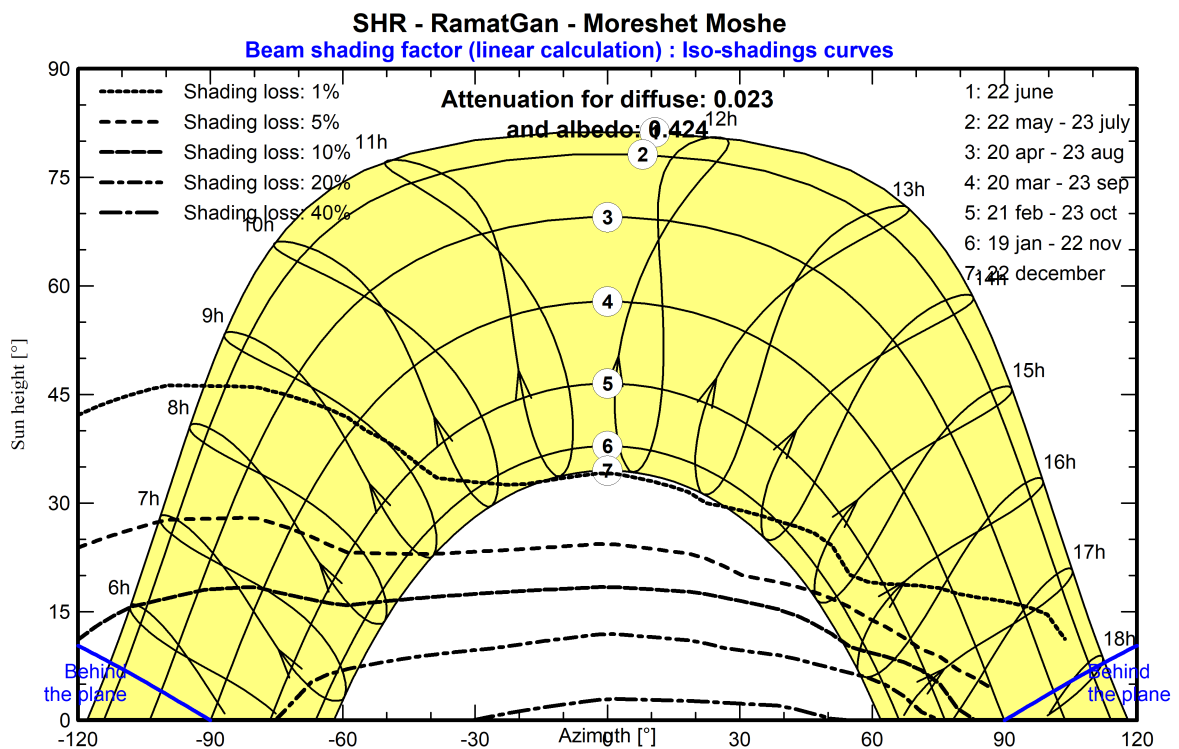


Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram





Project: SHR - RamatGan - Moreshet Moshe

Variant: New simulation variant

PVsyst V7.2.2

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Main results

System Production

Produced Energy

85.82 MWh/year

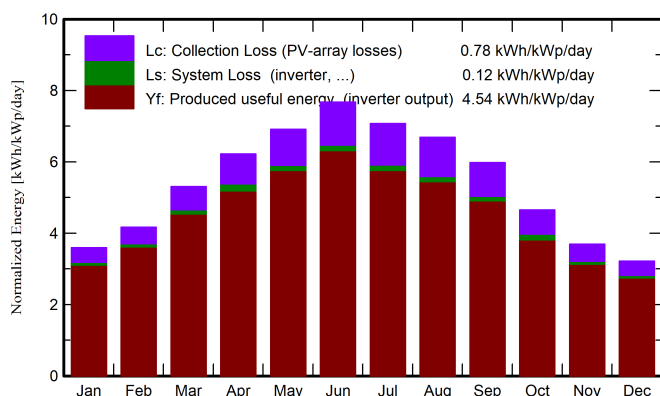
Specific production

1656 kWh/kWp/year

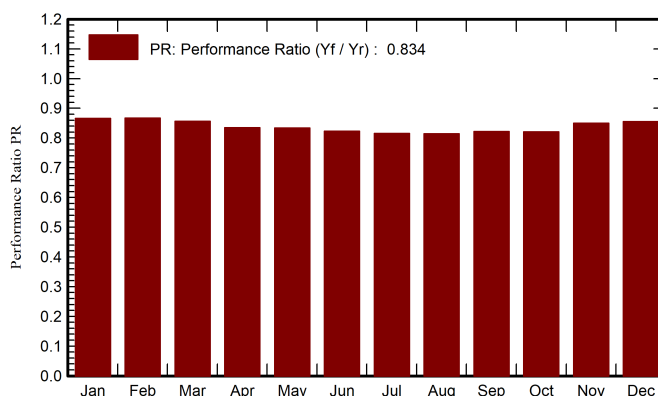
Performance Ratio PR

83.42 %

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	39.17	12.88	111.4	103.2	5.12	5.002	0.866
February	101.2	45.43	14.04	116.8	109.4	5.38	5.249	0.867
March	151.1	66.94	16.79	164.6	155.0	7.48	7.303	0.856
April	178.4	75.78	19.34	186.5	175.9	8.38	8.070	0.835
May	213.5	86.64	22.90	214.4	202.1	9.50	9.264	0.833
June	233.4	69.27	25.63	230.2	217.5	10.07	9.823	0.823
July	220.9	77.32	28.34	219.2	206.7	9.50	9.269	0.816
August	201.6	74.40	28.93	207.4	195.7	8.98	8.762	0.815
September	166.3	59.67	26.82	179.5	169.0	7.84	7.645	0.822
October	127.9	59.50	23.98	144.1	135.1	6.39	6.134	0.821
November	93.5	43.38	19.02	110.7	103.3	5.00	4.882	0.850
December	81.0	35.46	15.00	99.7	92.0	4.53	4.420	0.855
Year	1860.2	732.95	21.18	1984.6	1864.9	88.18	85.823	0.834

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

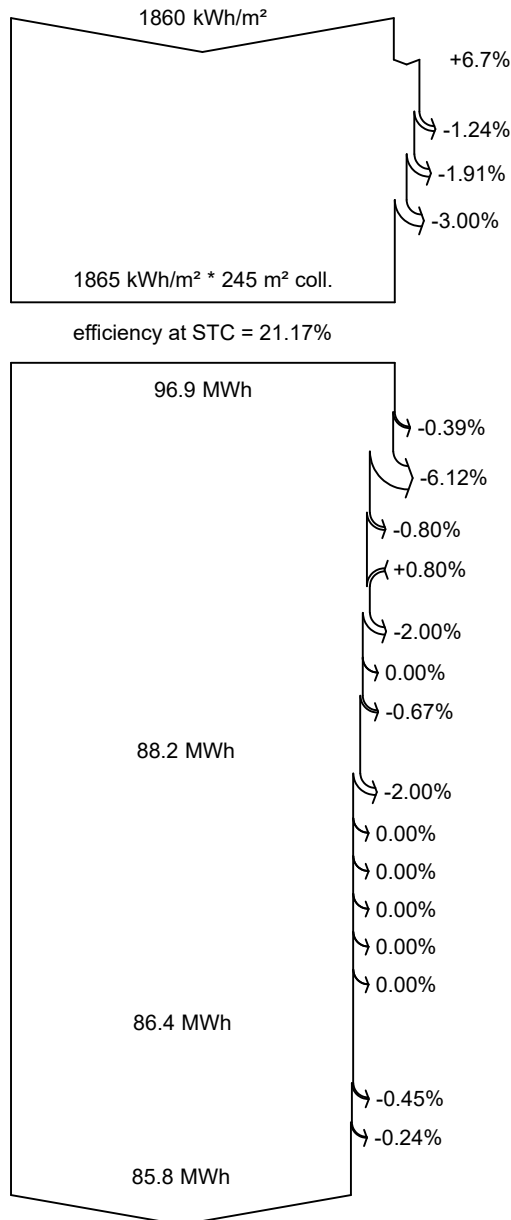
PR Performance Ratio



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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

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

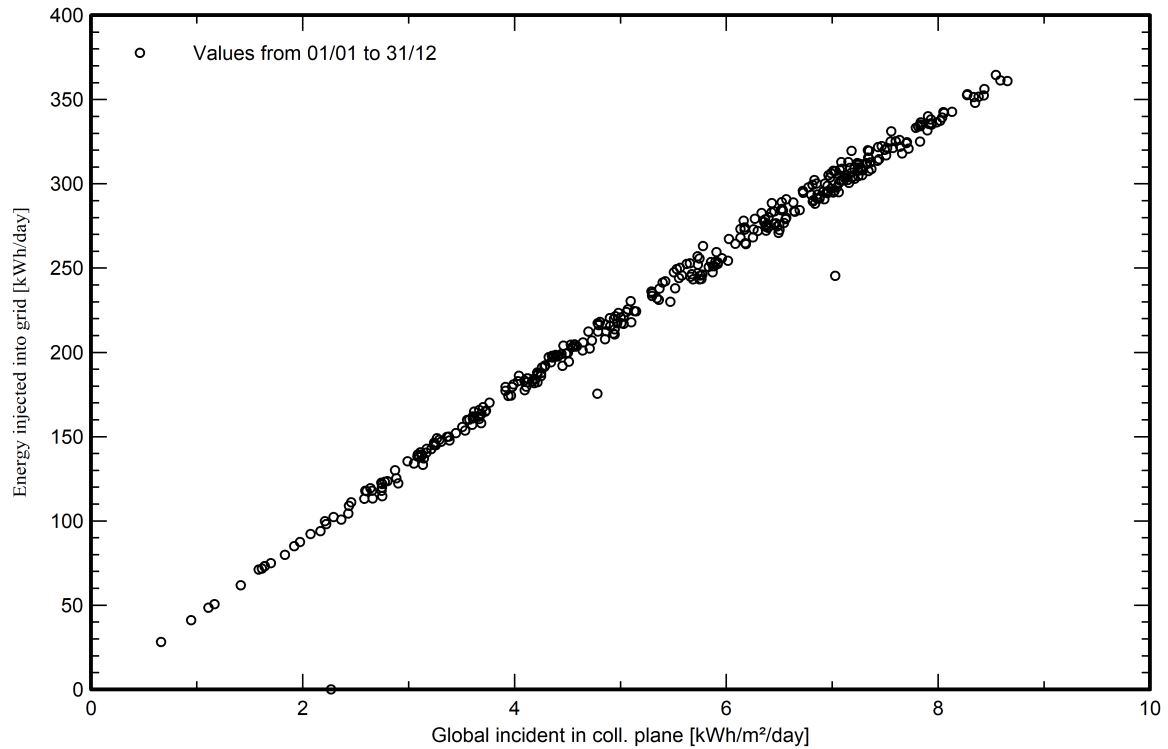


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Special graphs

Daily Input/Output diagram



System Output Power Distribution

