UAB Solet Technics
Žirmūnų g.139, Vilnius

Project Name: Fotovoltinė saulės elektrinė ant daugiabučio stogo
Offer no.: 19-021

2019.01.28

Your PV system from UAB Solet Technics

Address of Installation

Gedvydžių g. 25,
06311 Vilnius
Vilniaus m. sav.

Project Overview

Figure: Overview Image, 3D Design

PV System

3D, Grid-connected PV System

Climate Data	Vilnius, LTU (2000 - 2009)	
PV Generator Output	4,86	kWp
PV Generator Surface	29,3	m²
Number of PV Modules	18	
Number of Inverters	1	

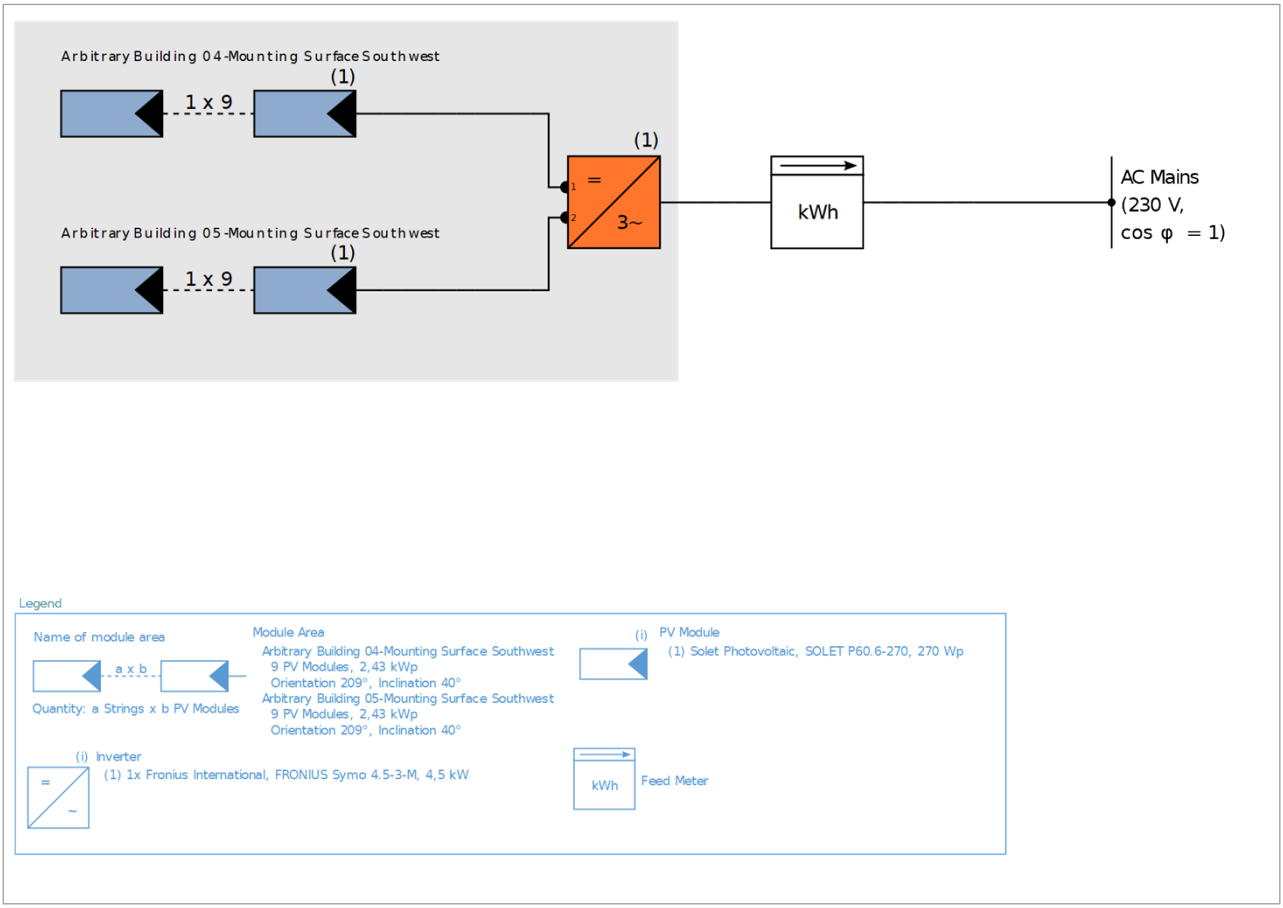

Figure: Schematic diagram

The yield

The yield

PV Generator Energy (AC grid)	4.298 kWh
Grid Feed-in	4.298 kWh
Down-regulation at Feed-in Point	0 kWh
Own Power Consumption	0,0 %
Solar Fraction	0,0 %
Spec. Annual Yield	884,33 kWh/kWp
Performance Ratio (PR)	83,0 %
Yield Reduction due to Shading	3,5 %/year
CO_2 Emissions avoided	2.579 kg / year

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	3D, Grid-connected PV System
Start of Operation	2019.01.25

Climate Data

Location	Vilnius, LTU (2000 - 2009)
Resolution of the data	1 h
Simulation model used:	
- Diffuse Irradiation onto Horizontal Plane	Perez & Ineichen
- Irradiance onto tilted surface	Perez

Module Areas

1. Module Area - Arbitrary Building 04-Mounting Surface Southwest

PV Generator, 1. Module Area - Arbitrary Building 04-Mounting Surface Southwest

Name	Arbitrary Building 04-Mounting Surface Southwest	
PV Modules	9 x SOLET P60.6-270	
Manufacturer	Solet Photovoltaic	
Inclination	40	°
Orientation	Southwest 209	°
Installation Type	Roof parallel	
PV Generator Surface	14,6	m²

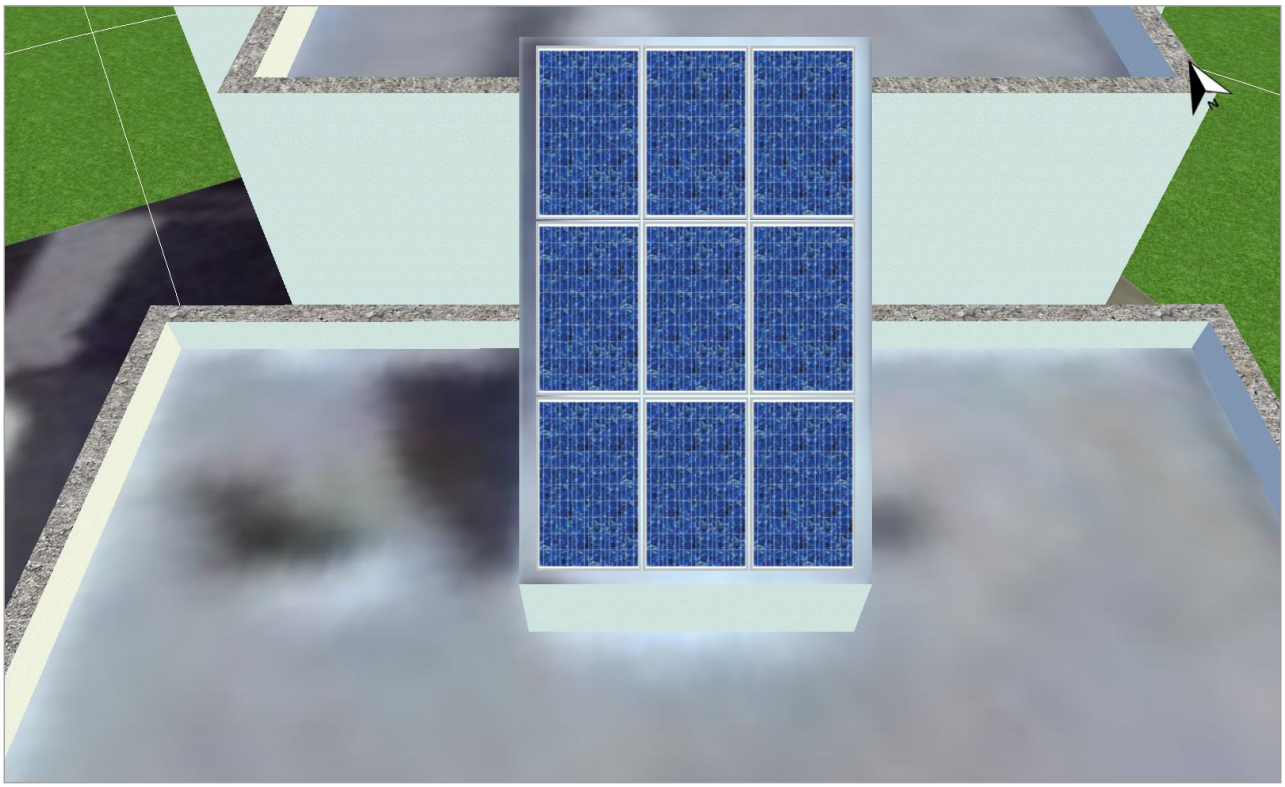

Figure: 1. Module Area - Arbitrary Building 04-Mounting Surface Southwest

2. Module Area - Arbitrary Building 05-Mounting Surface Southwest

PV Generator, 2. Module Area - Arbitrary Building 05-Mounting Surface Southwest

Name	Arbitrary Building 05-Mounting Surface Southwest	
PV Modules	9 x SOLET P60.6-270	
Manufacturer	Solet Photovoltaic	
Inclination	40	°
Orientation	Southwest 209	°
Installation Type	Roof parallel	
PV Generator Surface	14,6	m²

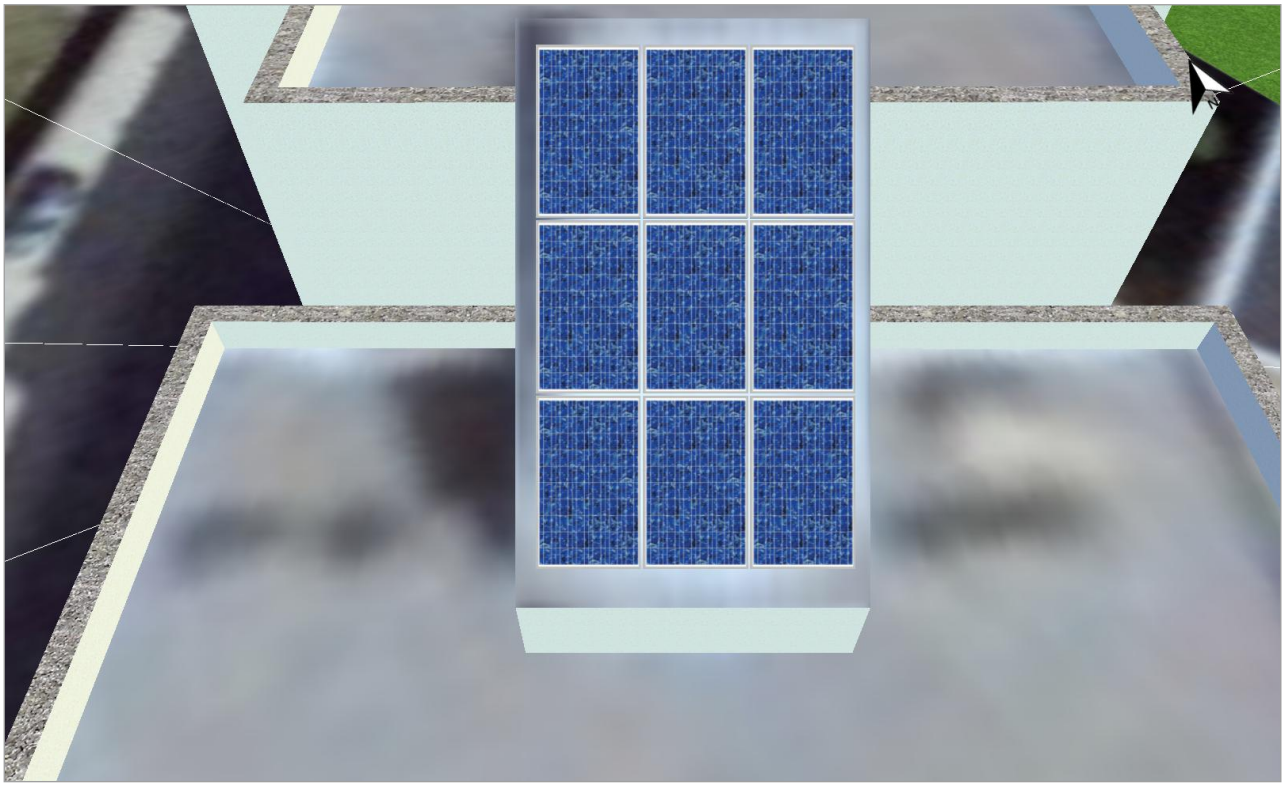

Figure: 2. Module Area - Arbitrary Building 05-Mounting Surface Southwest

Inverter configuration

Configuration 1

Module Areas	Arbitrary Building 04-Mounting Surface Southwest + Arbitrary Building 05-Mounting Surface Southwest
Inverter 1	
Manufacturer	Fronius International
Model	FRONIUS Symo 4.5-3-M
Quantity	1
Sizing Factor	108 %
Configuration	MPP 1: 1 x 9
	MPP 2: 1 x 9

AC Mains

AC Mains

Number of Phases	3
Mains Voltage (1-phase)	230 V
Displacement Power Factor (cos phi)	+/- 1

Simulation Results

Results Total System

PV System		
PV Generator Output	4,9	kWp
Spec. Annual Yield	884,33	kWh/kWp
Performance Ratio (PR)	83,0	%
Yield Reduction due to Shading	3,5	%/year
Grid Feed-in	4.298	kWh/year
Grid Feed-in in the first year (incl. module degradation)	4.298	kWh/year
Standby Consumption (Inverter)	16	kWh/year
CO_2 Emissions avoided	2.579	kg / year

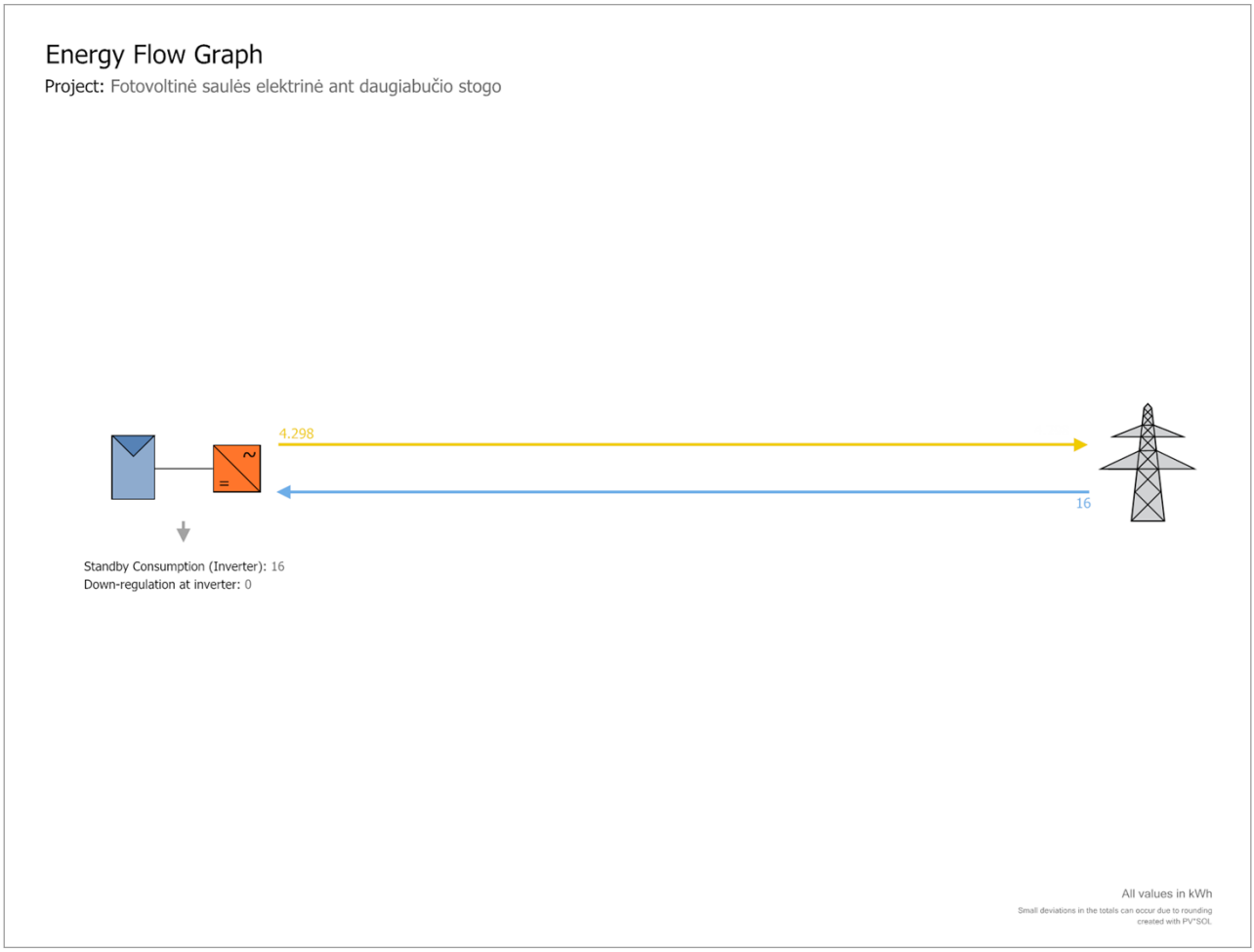

Figure: Energy Flow Graph

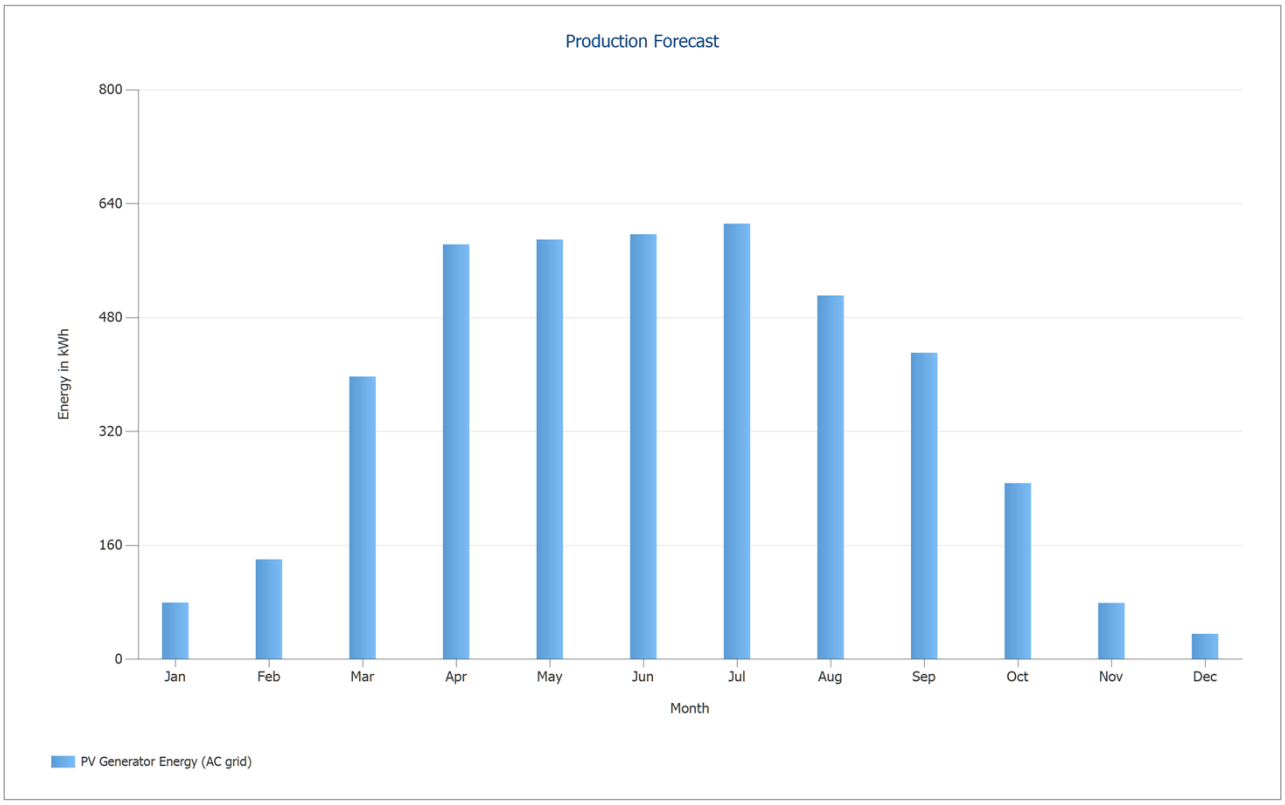

Figure: Production Forecast

Results per Module Area

Arbitrary Building 04-Mounting Surface Southwest

PV Generator Output	2,43 kWp
PV Generator Surface	14,6 m²
Global Radiation at the Module	1037,3 kWh/m²
PV Generator Energy (AC grid)	2151,9 kWh/year
Spec. Annual Yield	885,5 kWh/kWp
Performance Ratio (PR)	83,6 %

Arbitrary Building 05-Mounting Surface Southwest

PV Generator Output	2,43 kWp
PV Generator Surface	14,6 m²
Global Radiation at the Module	1048,8 kWh/m²
PV Generator Energy (AC grid)	2146 kWh/year
Spec. Annual Yield	883,1 kWh/kWp
Performance Ratio (PR)	82,4 %

Data Sheets

PV Module Data Sheet

PV Module: SOLET P60.6-270

Manufacturer	Solet Photovoltaic	
Available	Yes	
Electrical Data		
Cell Type	Si polycrystalline	
Only Transformer Inverters suitable	No	
Number of Cells	60	
Number of Bypass Diodes	3	
Mechanical Data		
Width	992	mm
Height	1640	mm
Depth	40	mm
Frame Width	20	mm
Weight	18,2	kg
Framed	Yes	
I/V Characteristics at STC		
MPP Voltage	33,8	V
MPP Current	8,16	A
Nominal output	270	W
Open Circuit Voltage	38,9	V
Short-Circuit Current	8,66	A
Increase open circuit voltage before stabilisation	0	%
I/V Part Load Characteristics		
Values source	Manufacturer/user-created	
Irradiance	200	W/m²
Voltage in MPP at Part Load	30,36	V
Current in MPP at Part Load	1,74	A
Open Circuit Voltage (Part Load)	37,34	V
Short Circuit Current at Part Load	1,84	A
Further		
Voltage Coefficient	-132,26	mV/K
Electricity Coefficient	4,33	mA/K
Output Coefficient	-0,39	%/K
Incident Angle Modifier	98	%
Maximum System Voltage	1000	V
Spec. Heat Capacity	920	J/(kg*K)
Absorption Coefficient	70	%
Emissions Coefficient	85	%

Inverter Data Sheet

Inverter: FRONIUS Symo 4.5-3-M

Manufacturer	Fronius International	
Available	Yes	
Electrical Data		
DC nominal output	4,6	kW
AC Power Rating	4,5	kW
Max. DC Power	4,7	kW
Max. AC Power	4,5	kVA
Standby Consumption	7	W
Night Consumption	1	W
Feed-in from	60	W
Max. Input Current	32	A
Max. Input Voltage	1000	V
Nom. DC Voltage	595	V
Number of Feed-in Phases	3	
Number of DC Inlets	4	
With Transformer	No	
Change in Efficiency when Input Voltage deviates from Rated Voltage	-0,65	%/100V
MPP Tracker		
Output Range < 20% of Power Rating	99,9	%
Output Range > 20% of Power Rating	100	%
No. of MPP Trackers	2	
Max. Input Current per MPP Tracker	16	A
Max. Input Power per MPP Tracker	4,7	kW
Min. MPP Voltage	150	V
Max. MPP Voltage	800	V

Plans

Circuit Diagram

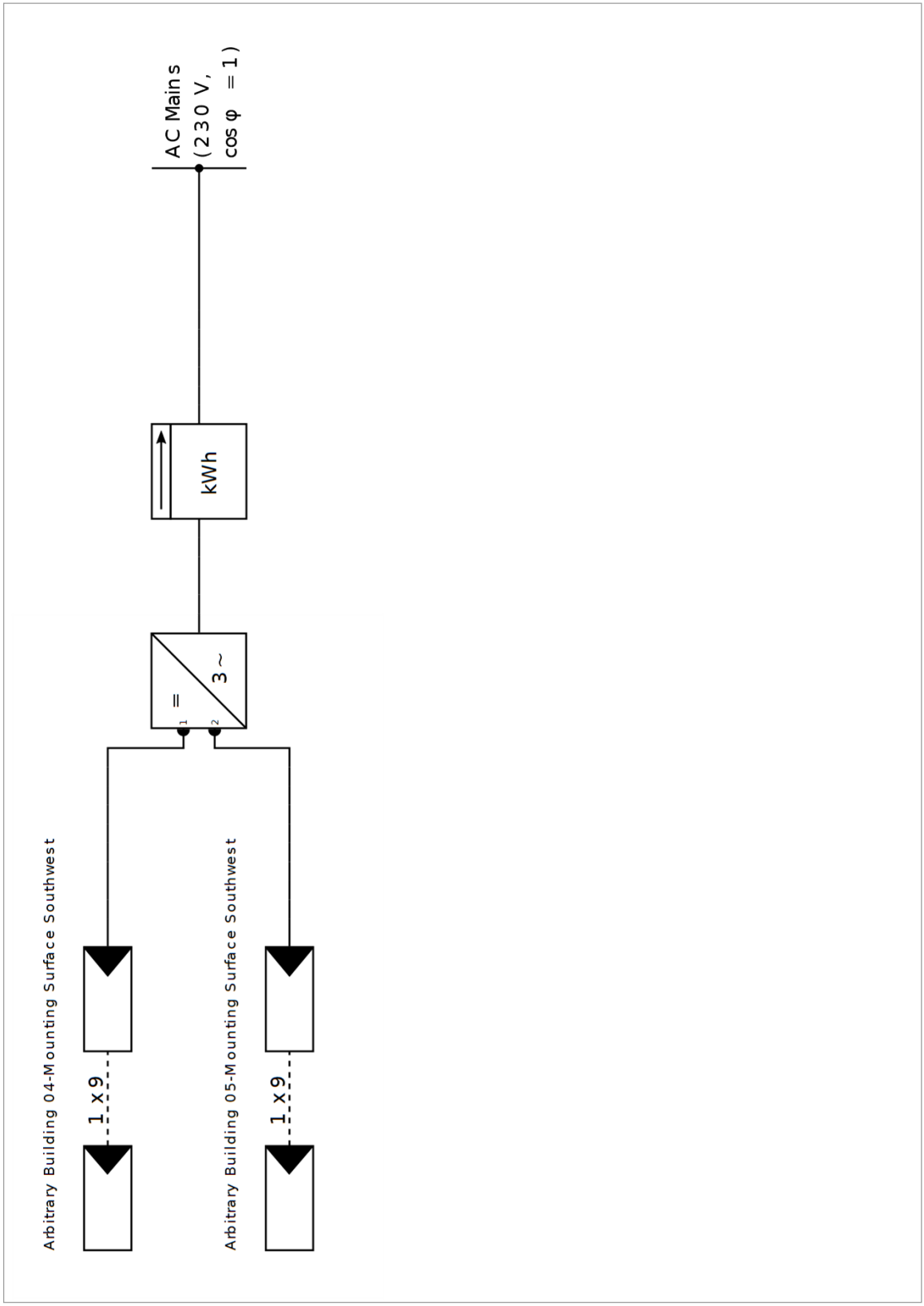

Figure: Circuit Diagram

Dimensioning Plan

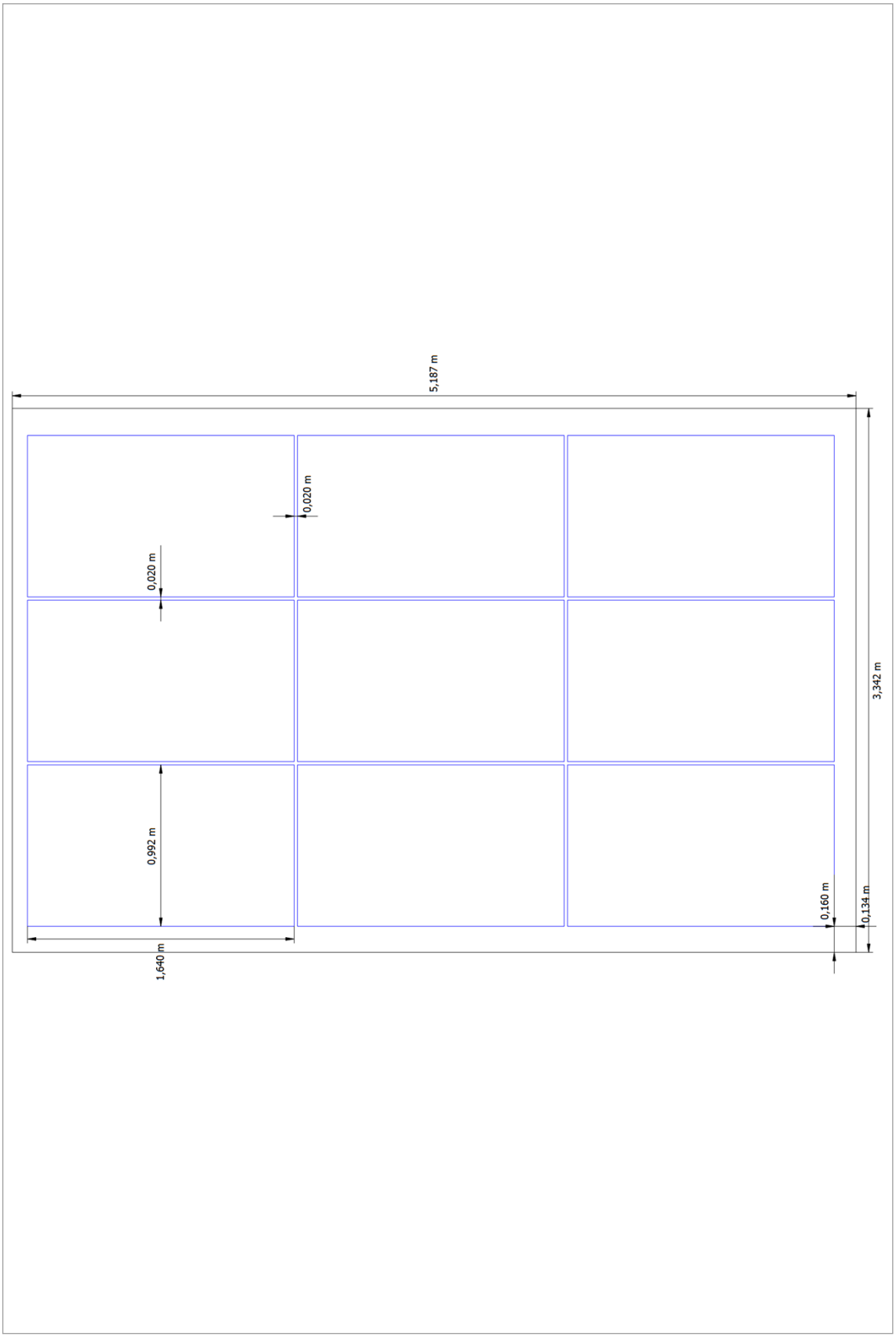

Figure: Arbitrary Building 04-Mounting Surface Southwest

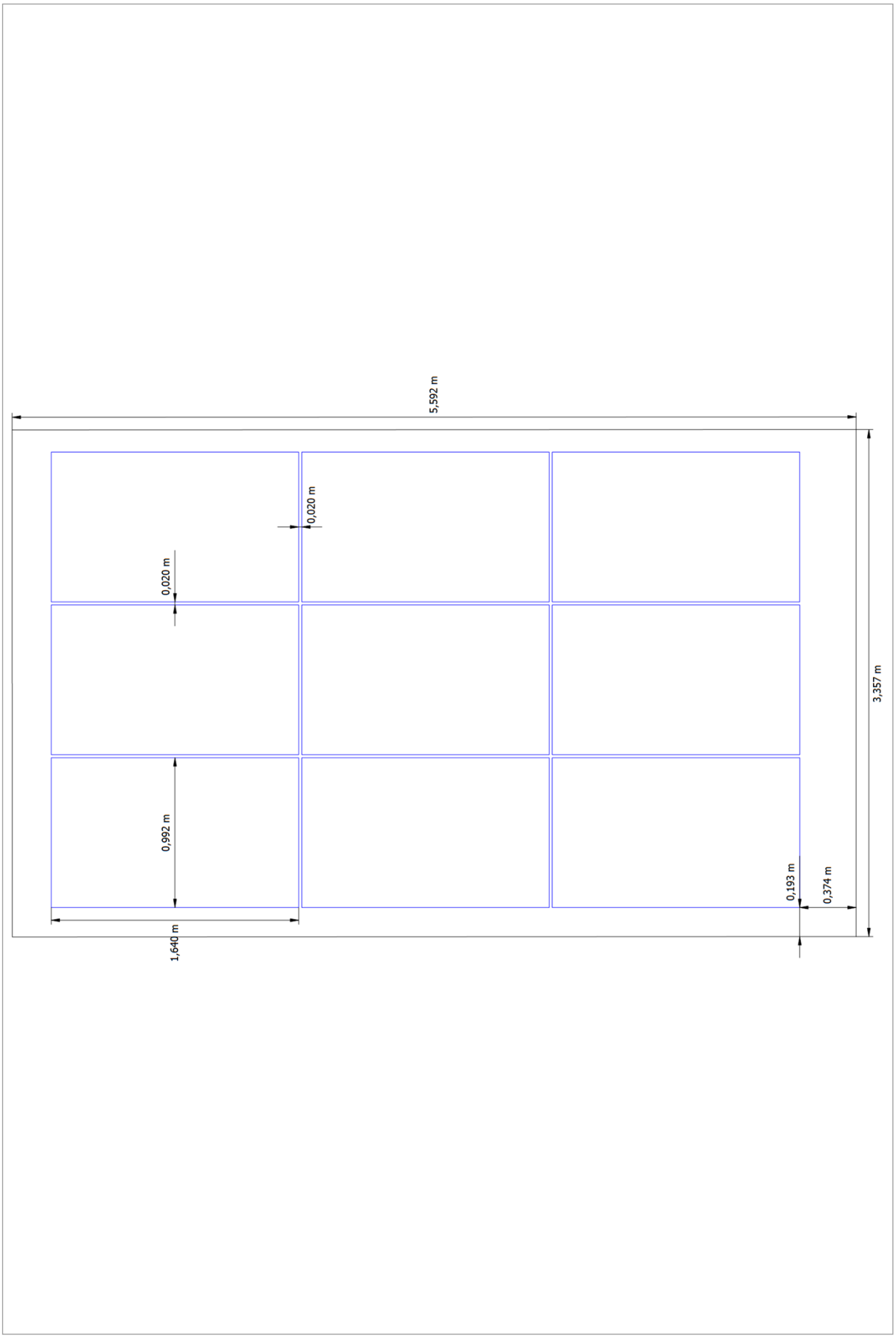

Figure: Arbitrary Building 05-Mounting Surface Southwest