logic.ip

hero.wind module installation

03

The future of green energy

1 Terms of Service

All information and notes in this document have been compiled taking into account applicable standards and regulations and the state of the art.

Version 2.2

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2 About this context

2.1 Purpose of this document

The purpose of this document is to ensure the safe and proper use of hero. systems. The project manager must ensure that the operating personnel have read and understood the document. The document must be kept within easy reach.

2.2 Target group

The project manager is responsible for the required qualification of the specialist personnel. The project manager must ensure that only personnel commissioned by the manager work on the hero. system.

Qualified personnel

Persons working on hero. systems must be competent and:

- be sufficiently trained for the respective tasks,
- know and follow the applicable technical rules and safety regulations,
- have read and understood the operating instructions.

An expert is someone who has sufficient knowledge in the field of solar technology due to professional training and experience and who is familiar with the applicable occupational safety and accident prevention regulations, the guidelines and generally accepted rules of technology and the standards to such an extent that the person is able to assess the safe working condition on the roof and of the hero. system.

2.3 Representation conventions

Symbols and text markings

This document contains various symbols and text markings.

Symbol	Name	Function
•	List	The bullet point marks a list.
✓ ▶	Prerequisite Action	The green checkmark marks a prerequisite that must be met for the subsequent action marked by a black triangle.
▶ ⇨	Action Reaction	The black triangle marks actions that must be performed in the appropriate order. The white arrow marks the reaction to an action.
(1)	Item numbers	The number in brackets refers to the corresponding item in the image.
Address [▸ page 5]	Cross-reference	Cross-references are used to refer to a chapter within the document. They are linked and can be executed in the PDF by a mouse click.

Tips are used to assist the reader in using the product.

2.4 Intended use

The hero.wind system is designed to produce clean energy from solar, wind and thermal sources on sloped roof surfaces. The hero. system can be installed on all residential as well as commercial roofs.

Misuse

Any use of the product beyond the intended use or any other use is considered misuse and can lead to dangerous situations. Claims of any kind for damage due to misuse are excluded.

2.5 Related documents

For more information about the hero. system please refer to the following documents:

ID	Document name	Contents
01	hero. system manual Basics	• System Overview • Technical data • Project Phases
02	hero.flat module installation	• System description • Interfaces • Installation • Technical data
03	**hero.wind module installation**	• **System description** • **Interfaces** • **Installation** • **Technical data**
04	Roof and roof sheet metal	In the context of a detailed offer
05	Laying of electricity and heat lines	• Heat utilization by solar thermal heating • Piping, wiring, connections
06	Biological thermal transfer fluid Basics	• Technical data • Filling
07	Design variants	In the context of a detailed offer
08	Suggestions for the building services	• Air-to-water heat pump • Ground source heat pump
09	Planning aids	In the context of a detailed offer

You can download the documents from the download area at https://www.logic.swiss or contact us directly:

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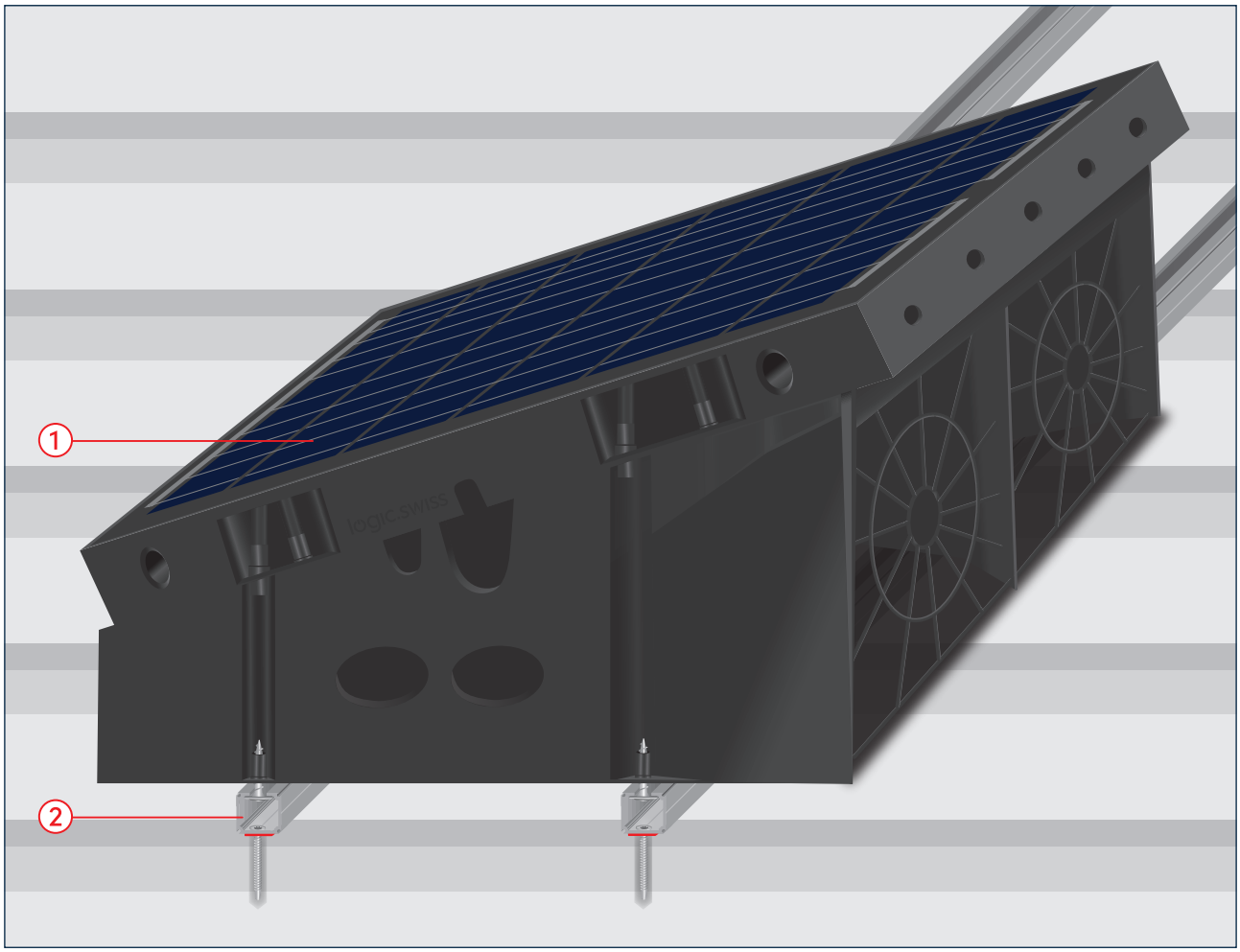
3 The hero.wind system

3.1 System description



The hero.wind system consists of the following components:

1 hero.wind module
2 Mounting rail

All components are compatible with all systems and depend on the needs of the building owner.

3.2 Function

hero.wind uses the roof area multiple times to produce clean energy from sun, wind and thermal power. This combination generates energy around the clock, both at night, in winter and on days with little sunshine. In principle, hero.wind modules can be used on roof pitches from 30 to 45°. However, optimum efficiency is achieved at a roof pitch of around 30 to 35°.

hero.wind produces up to three times more energy on the same roof surface. Sun, wind and thermal power are combined in one module.

The cooling system increases the efficiency of the hero. modules by up to 20 %. In addition, the cooling system prevents the solar cells from overheating and increases the service life of the modules.

Ventilation behind the collector housing must be sufficient and comply with national regulations and building codes. Additional insulation cannot be attached to the back of the collector.

3.3 Interfaces to building services

The hero.wind system supplies electricity and heat from the roof. All subsequent components are compatible with all systems and depend on the needs of the building owner.

The following components compatible with all systems are also required:

1 Solar inverter (inverter with electricity meter)

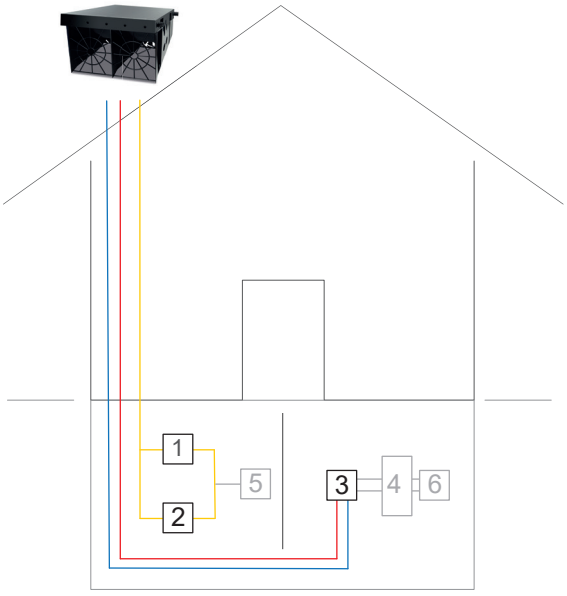
2 Wind inverter (frequency converter with electricity meter)

3 & 4 Thermo-inverter consisting of circulation pump (3), hot water/day tank (4) as well as Bio- TTF (biological thermal transfer fluid)

The following interfaces to the building services by third party suppliers (without connection to logic.swiss) are available:

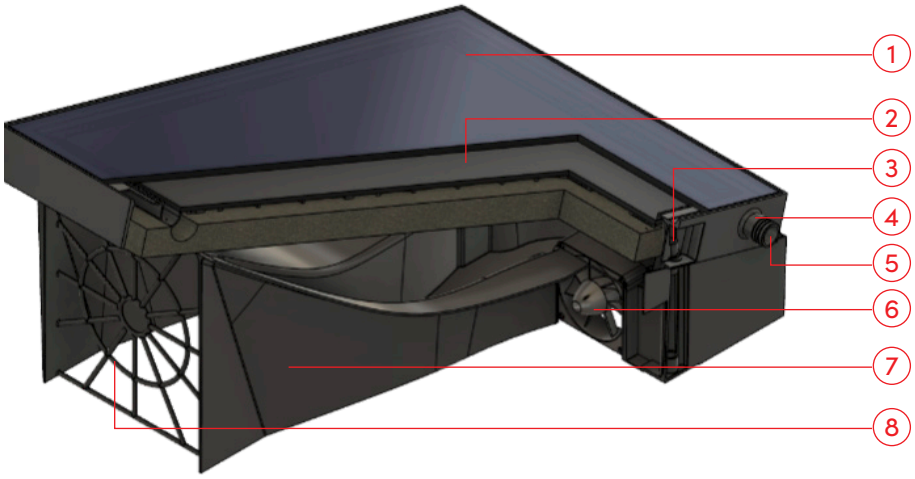
5 Storage tank

6 Heat pump, storage tank



Electricity generation | Heat generation

3.4 hero.wind module



1 Solar panel
2 Cooling Unit (CU)
3 Double-clip connector
4 Sealing ring
5 Connecting fitting
6 Generators
7 Chassis
8 Protective grid

4 Safety

4.1 Warnings

Warnings are marked by symbols and introduced by signal words indicating the extent of the hazard.

⚠ HAZARD

Danger

This safety warning applies in the event of a hazard that can directly lead to serious physical injury or death.

- ▶ Measures to avoid the hazard.

⚠ WARNING

Warning

This safety warning applies in the event of a hazard that can possibly lead to serious physical injury or death.

- ▶ Measures to avoid the hazard.

NOTICE

Note

Signal word for a possibly harmful situation that can possibly damage the machine or an object in its environment.

- ▶ Measures to avoid the harmful situation.

4.2 Residual risks

hero. systems are built in accordance with applicable standards and recognized safety rules. They correspond to the state of the art. Nevertheless, danger to life and limb of the user or third parties or damage to the components and other material assets may occur during use.

Danger from electricity
Electricity implies many dangers. There is a danger to life when coming into contact with live components. The entire system is constantly live. Damage to the insulation or individual components can be life-threatening.

- Do not touch live parts.
- Disconnect or short-circuit current-producing parts.
- Work on the electricity supply must only be carried out by authorized specialists.

Danger due to arcing

The hero. system implies the risk of arcing which can lead to internal and external burns, heart problems or blinding. There is also a risk of fire to the neighboring parts.

- Do not disconnect live connections.
- Replace damaged cables, connectors and connections.
- Switch off the system before working on live parts.

Danger from hot fluids

The heated fluids in the hero. system imply a risk of burns to the skin and eyes.

- Drain fluids before opening any connections.

Danger from high pressures

After commissioning, the entire system is under pressure. Fluids spraying at high pressures from defective lines can cause injuries. There is also a risk of material damage to the modules or plant.

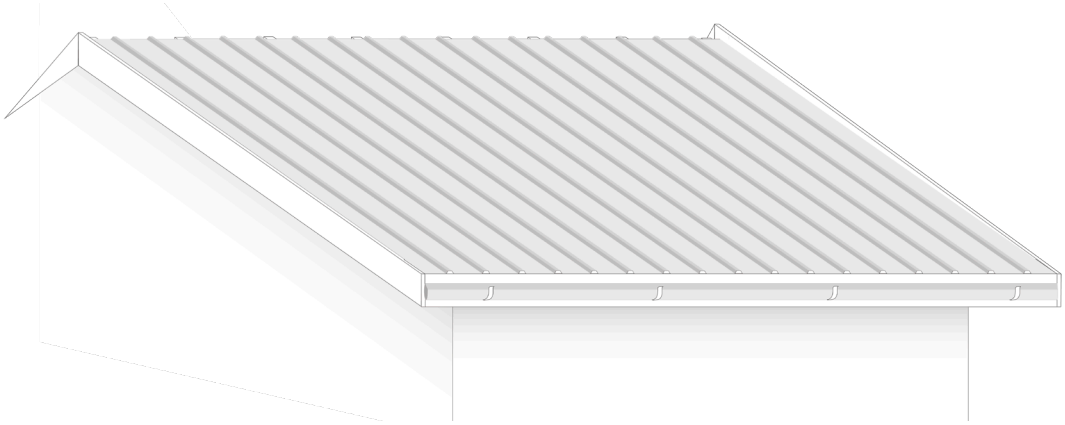
- Drain fluids before opening any connections.
- Work on the system must only be carried out by authorized specialists.

5 Installation instructions for the hero.wind system

5.1 In two steps to the hero.wind roof

5.1.1 Installing the mounting rails

Initial situation



✓ **Qualified personnel:** Solar engineer

✓ **Required material:** Mounting rail screws

✓ **Mounting tools:** cordless screwdriver, bit set / Torx, screwdriver, mounting lever, Mounting aid 220 x 224 mm (e.g. made of wood), wrench set, work gloves

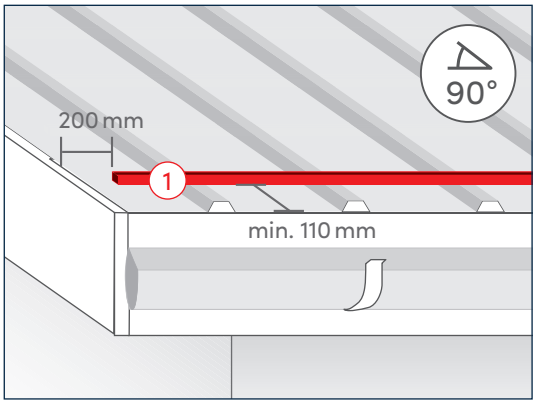
▶ Mount the mounting rails starting from the bottom left.

▶ Secure the mounting rails with screws spaced at maximum of 650 mm.

The mounting rails can be installed in sequence from left to right and from the bottom up. This allows time-saving simultaneous installation.

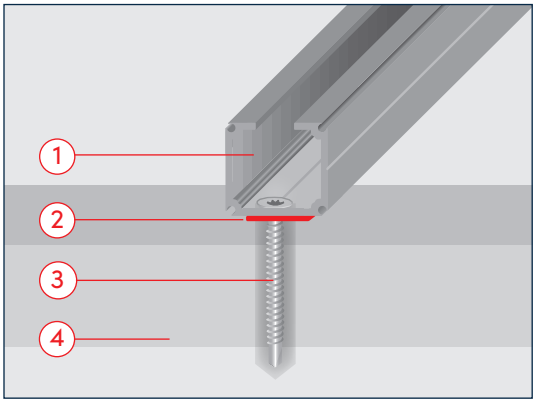
▶ Place the first mounting rail (1) at a distance of at least 110 mm above the eaves.

▶ Locate the first mounting rail at a 90° angle horizontally and 200 mm away from the verge.

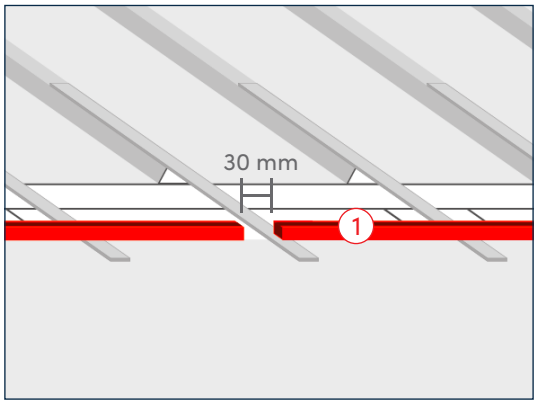


▶ Attach a piece of insulation (2) between the trapezoidal sheet metal and mounting rail.

▶ Secure the mounting rail to the trapezoidal sheet metal (4) using a screw (3).

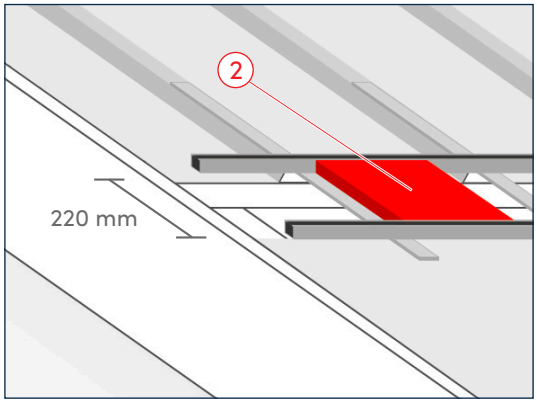


- Locate the next mounting rail (1) to the right of it with a gap of 30 mm.

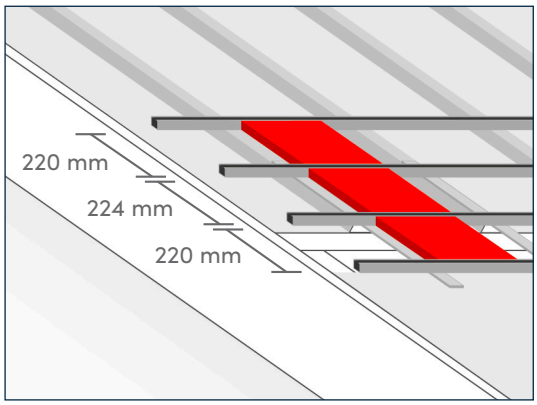


The mounting aids are cut to size by the solar installer, e. g. from a piece of wood.

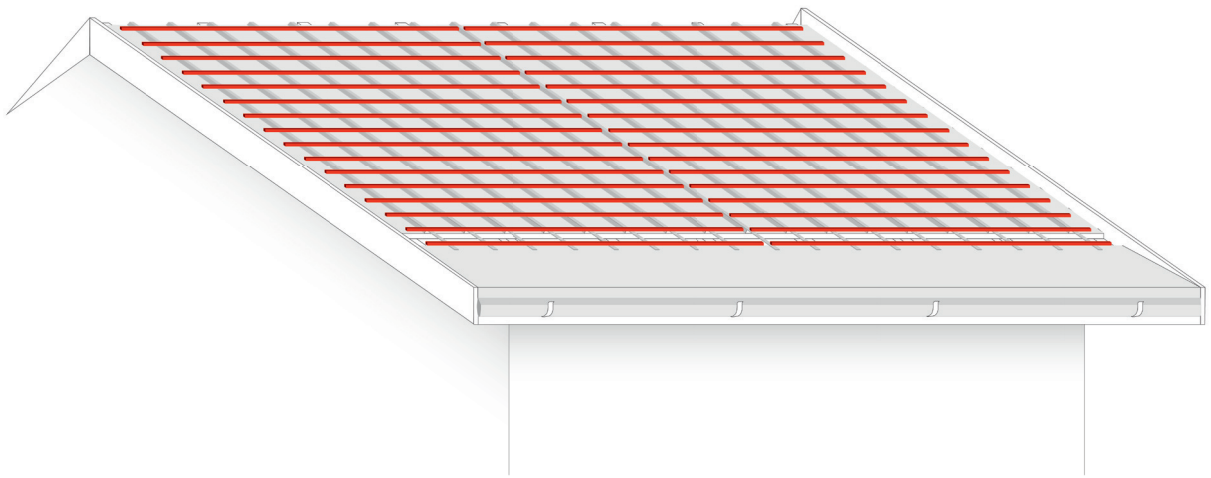
- Align the next row with a spacing of 220 mm using the mounting aid (2) and secure it like the first row.



- Align the next row with a spacing of 224 mm using the mounting aid and secure it like the previous row.
- Then alternately install one row with a spacing of 220 mm and the subsequent one with a spacing of 224 mm.
- Repeat the procedure until the entire roof is fitted with mounting rails.
- Carry out a final check.

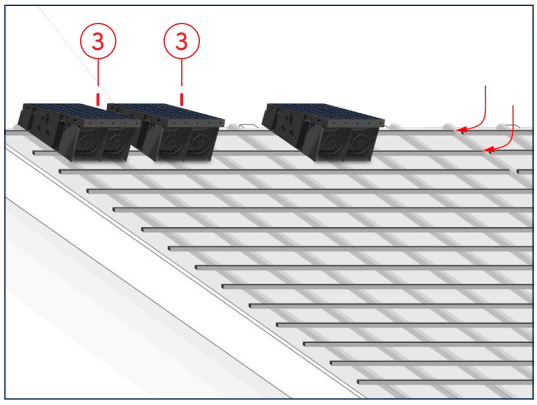


When the entire roof is fitted with mounting rails, the modules can be mounted.

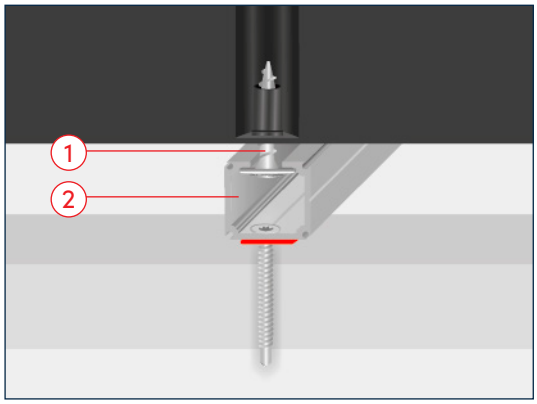


5.1.2 Mounting the modules

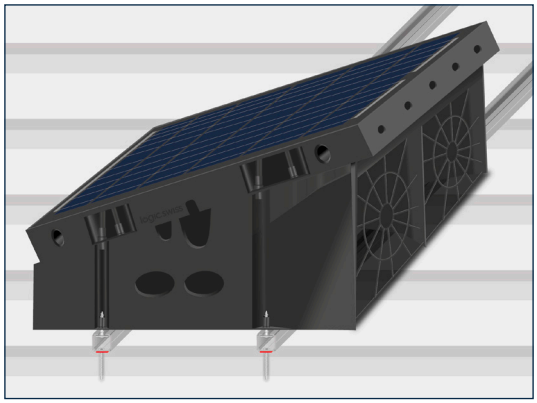
- ✓ **Qualified personnel:** Solar engineer
- ✓ **Required material:** Mounting rail screws
- ✓ **Mounting tools:** cordless screwdriver, bit set / Torx, screwdriver, mounting lever, spacers 3 mm, wrench set, work gloves



- ▶ Start installing the modules from the top of the roof and from right to left.
- ▶ Depending on the Structure, module installation can also start at the bottom left.



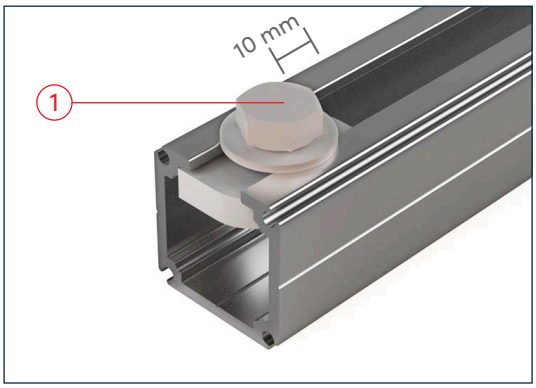
- ▶ Insert one module after the other with the pre-installed sliding screws (1) from the right-hand side into the top two mounting rails (2).
- ▶ If the modules do not retract well, the mounting rails can be moistened with silicone can be wetted.
- ▶ Mount the modules with a spacer (3) of 3 mm. The Spacers must extend from the top to the bottom of the module. (Modules are conical due to manufacturing) Do not remove spacer until all modules of this row are mounted.
- ▶ Connect the PV connector (MC4) and the wind connector (MC10) on the right of the mounted module to the connectors on the left of the adjacent module.
- ▶ Check that the connecting fittings on the modules are fully greased, and re-grease, if necessary.
- ▶ Push the connected cables slightly back into one of the modules so that they are not pinched when connecting the modules.
- ▶ It must be ensured that the outside temperature does not fall below 10° C.



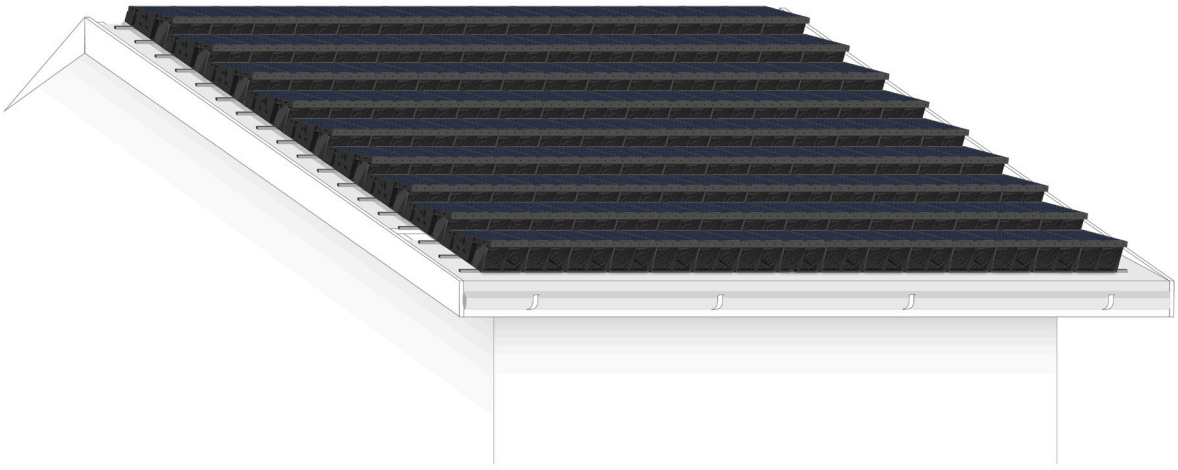
The recommended string length is up to 30 modules. A maximum of 75 modules may be mounted in one row.

- When a module row is full, place a stopper (1) on both sides of the module row at a distance of 10 mm from the module.

  ⇨ The first module row is fully installed.
- Proceed in the same way for all further module rows.
- Start mounting the next module row below the existing module row.



When all modules have been mounted in the module fields, the system is ready for piping and cabling. See chapter Field connection.



5.2 Field connection

The field connection describes the field piping for the integrated cooling system of the solar panel as well as the field cabling of the PV and wind components up to the interconnection point to the building services.

The field piping and cabling is carried out according to the installation plan.

5.2.1 Field piping

For more information on field piping, see chapter Field piping in the document 05 Laying power and heat lines.

5.2.2 Field cabling

For more information on field cabling, see chapter Field cabling in the document 05 Laying electricity and heat lines.

5.3 Connection work

The following points only describe the general further procedure. The following steps are not exhaustive and some may not be suitable for implementation at the customer's site, the scope of the work and how the corresponding steps are carried out must be determined by the corresponding specialists.

5.3.1 Integration into the building services

Any additional building services required for the integration differ according to use, total energy yield and already existing building services.

In building services, a distinction must be made between heat utilization, storage, feed-in and electricity utilization, storage, supply. The functions here and below should be known to specialists.

5.3.2 Heat utilization

The integration of the building services for heat and domestic hot water is usually realized by a heat pump. Related components can be e. g. geothermal probes, storage tanks or pumps. Since the use depends on the building and the respective utilization, a building services engineer should be consulted.

5.3.3 Electricity use

Electricity is supplied to the building services via the inverters (PV). Self-use, supply and storage are carried out in accordance with local legislation.

5.3.4 Commissioning

- Commissioning takes place after successful integration of the hero. roof into the building services.
- For each trade, the correct execution of the work is verified by checklists (this falls into the responsibility of the respective trade associations – please contact them).
- A copy of the signed commissioning protocols should be provided to the skilled craftsman, the person commissioning the work, the overall project manager as well as Hero Renewable Energy GmbH in order to ensure and prove the proper operation of the system. This procedure can be helpful in case of any warranty issues.
- An approval by an independent external body can be arranged by Hero Renewable Energy GmbH.
  This service must be booked separately against extra charge.

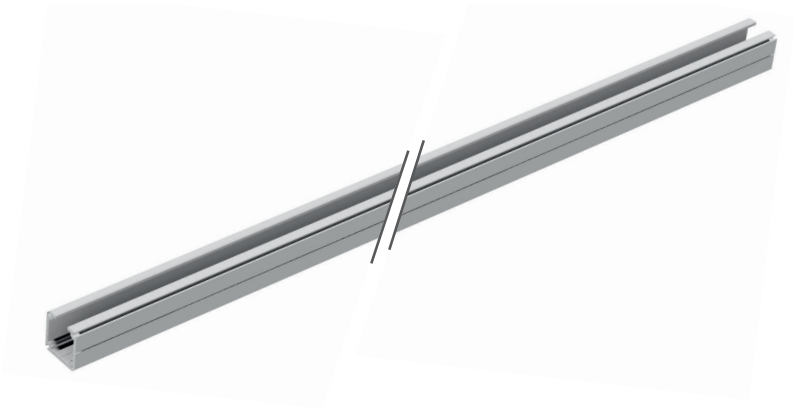
5.3.5 Maintenance and optimization

Maintenance of the plant should be carried out at regular intervals in accordance with applicable legal regulations and the standards of the industry. During maintenance, possible optimizations can also be worked out and implemented.

Maintenance is not part of the service offer.

6 Technical data

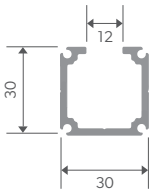
6.1 Mounting rail



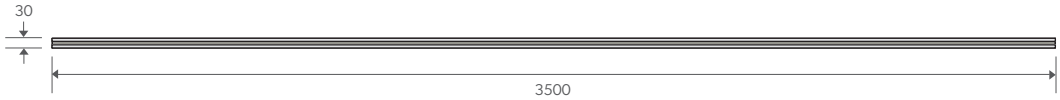
Technical drawings

Cross-section

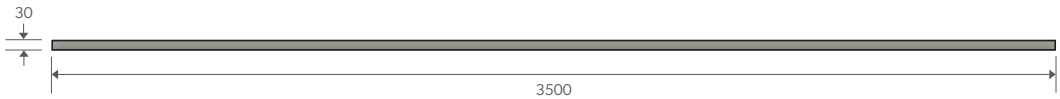
Drawing serves illustration purposes only. The dimensions are relevant.



Top view



Side view



Technical data	Unit	
Material		EN AW-6063 T66
Material thickness	mm	2.5
Dimensions (H / W / D)	mm	30 x 30 x 3500
Footprint (L / W)	mm	3500 x 30
Profile type		C-profile
Weight	kg	~2.4
Color		none

Corners		rounded
Surfaces		press blank
Delivery		without protective film
Tolerances		EN 12020-2 (fine)
DIN standard		DIN EN 755
Product warranty	years	25
Weather resistance	years	40

6.2 Module

hero.wind is the world's first module that uses the roof area multiple times and produces clean energy from sun, wind and thermal energy. This combination generates energy around the clock, both at night, in winter and on days with little sunshine. This turns your roof into a unique small power plant providing a very high level of self-sufficiency. hero.wind is suitable for all residential or commercial gable roofs. Optimal efficiency is achieved with a roof pitch of 30 to 35°.

Multiple energy

With hero.wind, multiple energy is produced on the same roof surface. Sun, wind and thermal energy are combined in one compact module.

24 hours / 365 days

The combination of wind power, photovoltaics and solar thermal energy generates energy at night, in winter, and on days with little sunshine.

Protection against electrosmog

hero. modules are mounted on a light-meta roof. This is 100 % waterproof and protects against electromagnetic pollution (electrosmog).

100 % climate positive

After only 2 years, the energy yield exceeds the energy required for production and is therefore CO_2-positive.

Maximum flexibility

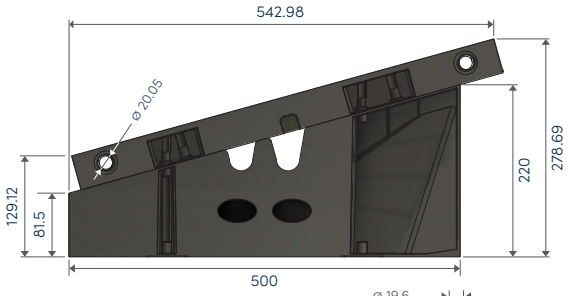
The compact module size enables maximum roof utilization, even for small gable roofs.

Fast amortization

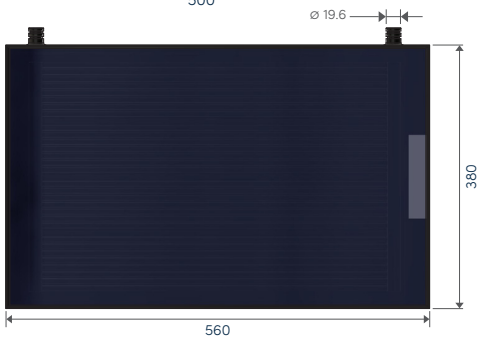
The investment is fully amortized within a few years. Thus, a high return is achieved.

Technical drawing

Side view



Top view



Data in [mm]

Technical data hero.wind module	Unit	hero.wind
Number of Modules per m²		ca. 5.3
Module base area (L/W)	mm	500×380
Dimensions module (H/W/L)	mm	278×380×542
Weight (empty)	kg	5.3
Weight (filled)	kg	6.7
Glass surface	mm	3.2
Color		Anthracite
Nominal operating temperature (NOCT)	°C	approx. – 40 to + 85
Max. wind/snow load	N/m²	up to 2400/5400
Max. hailstorm	Protection class 3 (7.6)	
Peak performance module	Wp	135
Peak performance electricity	Wp	40
Peak performance heat	Wp	95
Yield electricity/module/year	kWh/year	~43* to 70**
Yield hea/module/year	kWh/year	~60
Yield electricity/m²/year	kWh/year	~234 to 374
Yield heat/m²/year	kWh/year	~315
Efficiency gain due to cooling system	%	~20
Product warranty		15 years
Performance warranty PV (>=80%)		25 years
Performance warranty wind (>=80%)		25 years
Performance warranty cooling system		10 years
Weather resistance warranty		25 years
Standards & certificates		IEC 61215, IEC 61730, Solar-KEYMARK, CE, RoHS compliant
Klimaklasse		A

Technical data photovoltaic	Unit	hero.wind
Nominal power Pmpp	Wp	30
Open circuit voltage Uoc	V	8.12
Voltage Umpp	V	6.72
Short circuit current Isc	A	4.7
Electricity Impp	A	4.55
Efficiency	%	20
Temperature coefficient for Uoc	%/°C	– 0.30
Temperature coefficient for Isc	%/°C	– 0.05
Temperature coefficient for Pmpp	%/°C	– 0.39
Max. System voltage	V	1000
Max. Reverse current	A	20
Max. String fuse	A	20
Number of half cells		12
Cell type		S-PERC
Connector type		MC4
Connection cable	mm²	4

Technical data solar thermal	Unit	hero.wind
Gross area	m²	0.21
Aperture area ASol = Absorber area AA	m²	0.160
Optical efficiency***	%	65
Linear heat transfer coefficient***	W/(m² K)	4.75
Stagnation temperature	°C	70
Liquid volume per module	Liter	1.4
Permissible operating overpressure Pmax	Bar	0.25
Connection type		Open system (pipe)
Connection	inch	1/2

Technical data wind	Unit	hero.wind
Generator type		DC
Connector type		MC10
Rotor diameter	mm	80
Nominal power	W	3
Peak power	Wp	10
Nominal voltage range	VDC	24
Start-up speed	m/s	2
Nominal wind speed	m/s	7.5
Rated speed	rev/min	3000
Storm resistance up to	km/h	200
Yield electricity/module/year at 2 m/s	kWh/year	1
Yield electricity/module/year at 5 m/s	kWh/year	7
Sound emission	dB	20
Swept rotor area	mm²	6000
Number of blades		9
Number of generators/module		2
Open circuit voltage Uoc	V	36
Voltage Umpp	V	24
Short circuit current Isc	A	1
Current Impp	A	0.5
Efficiency	%	30

Abbreviations

A	Ampere - current intensity
AA	Visible, unshaded absorber area
Asol	Maximum projection area
Impp	Instantaneous maximum current
Isc	Short circuit current
m/s	Meters per second
N/m²	Newton per square meter - force
NOCT	Temperature of the solar cell during normal operation
P_{max}	Maximum system pressure
Pmpp	Rated power of the module
rev/min	Revolutions per minute
Umpp	Instantaneous maximum voltage or nominal voltage of the module
Uoc	Voltage in volts without load, or open circuit voltage
V	Volt – electrical voltage
VDC	Rated voltage in DC
W/(m² K)	Watts per square meter and Kelvin kWh/year
kWh/year	Kilowatt hours per year
Wh/year	Watt-hours per year
Wp	Watt Peak – Maximum achievable watts
*	at 5 m/s
**	at 20 m/s
***	Parameters of the efficiency curve are related to the aperture area

7 Glossary

Modules	
Cooling unit	Patented cooling component
Sealing ring	Silicone ring for sealing the modules to be plugged together
Double-clip connector	Connector for cooling unit and wind chassis
hero.wind module	Solar panel, cooling unit, wind chassis with generators
MC4 connector	MC4 connectors are single-contact electrical connectors commonly used to connect solar modules.
MC10-Stecker	Electrical connections for the hero.wind generators.
Solar panel	Glass surface with solar cells underneath
Connection fitting	Fitting for the connection of the modules
Wind chassis	Wind tunnel design
Wind chassis grille	Grille at module wind opening (front)
Wind generators	Generators for the generation of wind energy
Wind turbine	A wind turbine is a device that converts the kinetic energy of wind into electrical energy.

Integration / installation	
Mounting rail	The profile of the mounting rail, i. e. its cross-sectional view, resembles the shape of the letter C. The shape resembles a top-hat rail with the brims bent inwards.
Field connection	Connection of a module field
Field cabling	Wiring of the module fields
Field piping	Piping of the module fields
Frequency converter	A power converter that converts an input AC voltage into a different output AC voltage.
Bio-TTF	Biological thermal transfer fluid (heat transfer fluid)
Trade	Craft and construction work in the building industry
HVACS	Heating, ventilation, air-conditioning, sanitation technology
Mounting aid	Piece of wood to aid the installation of the mounting rails
Verge	Lateral termination of the roof surface on the vertical gable. The verge connects the end of the eaves with the end of the ridge. It does not intersect with any other roof slopes and is called the front face of the house.
Photovoltaics	Photovoltaics (PV) is the direct conversion of the sun's radiant energy into electrical energy using solar cells.
Solar inverter	Device for converting solar energy (direct current) into alternating current
Solar technology	The harnessing of solar radiation by means of technical aids and equipment.
Solar engineer	Solar engineers or solar technology specialists discuss, plan and build solar systems for water heating and electricity generation.
Solar heat	Conversion of solar radiation into thermal energy
Storage tank	Accumulator for storing energy

Integration / Montage	
String	Type of interconnection in strings
Thermal inverter	Pump for cooling thermally heated water
Circulation pump	A circulation pump in a heating system is a centrifugal pump that feeds the heated heat transfer medium (usually water) to the radiators and house connection stations in a closed circuit, while at the same time returning the cooled water via the return line so that it is heated again in the heating system.
Inverter	An inverter is an electrical device that converts DC voltage into AC voltage.
Wind inverter	Device for converting wind energy (direct current) into alternating current

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