



**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, even at night, in winter and on days with little sunshine. This turns your roof into a unique small power plant and enables a very high degree of self-sufficiency. **hero.wind** is suitable for all private or commercial pitched roofs. The optimum efficiency is achieved with a roof pitch of 30 - 35 °.



### 3 x more energy

With **hero.wind**, up to 3 times more energy is produced on the same roof area. Sun, wind and thermal energy are combined in one compact module.



### 100% climate positive

After only 2 years, the energy yield exceeds the energy required for production and is therefore CO<sub>2</sub> positive.



### 24h / 365 days

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



### Maximum flexibility

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



### Protection against electrosmog

The hero. Modules are attached to a light metal roof. This is 100% waterproof and protects against electromagnetic pollution (electrosmog).



### Fast amortization

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

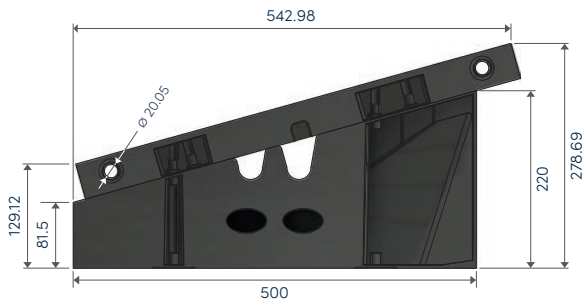
More information:



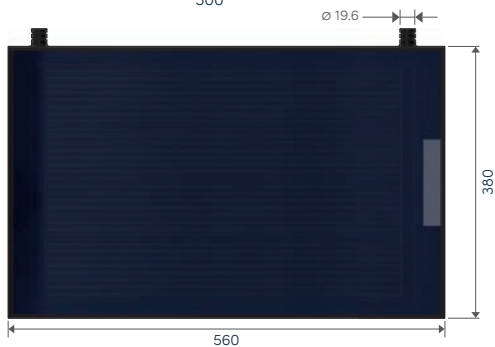
# hero.wind Module specifications

## Technical drawing

Side view



Top view



Data in [mm]

Technical data hero.wind module	Unit	hero.wind
Number of Modules per m <sup>2</sup>		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/m <sup>2</sup>	up to 2400/5400
Max. hailstorm		Protection class 3
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 heat/module/year	kWh/year	~60
Yield electricity/m <sup>2</sup> /year	kWh/year	~234 to 374
Yield heat/m <sup>2</sup> /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

## 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/m <sup>2</sup>	Newton per square meter - force
NOCT	Temperature of the solar cell during normal operation
P <sub>max</sub>	Maximum system pressure
Pmpp	Rated power of the module
rev/min	Revolutions per minute

## Technical data photovoltaic

Technical data photovoltaic	Unit	hero.wind
Nominal power P <sub>mp</sub>	Wp	30
Open circuit voltage U <sub>oc</sub>	V	8.12
Voltage U <sub>mp</sub>	V	6.72
Short circuit current I <sub>sc</sub>	A	4.7
Electricity I <sub>mp</sub>	A	4.55
Efficiency	%	20
Temperature coefficient for U <sub>oc</sub>	% / °C	-0.30
Temperature coefficient for I <sub>sc</sub>	% / °C	-0.05
Temperature coefficient for P <sub>mp</sub>	% / °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	mm <sup>2</sup>	4

## Technical data solar thermal

Technical data solar thermal	Unit	hero.wind
Gross area	m <sup>2</sup>	0.21
Aperture area ASol = Absorber area AA	m <sup>2</sup>	0.160
Optical efficiency***	%	65
Linear heat transfer coefficient***	W/(m <sup>2</sup> K)	4.75
Stagnation temperature	°C	70
Liquid volume per module	Liter	1.4
Permissible operating overpressure P <sub>max</sub>	Bar	0.25
Connection type		Open system (pipe)
Connection	inch	1/2
Thermal insulation back wall (optional)	mm	15

## Technical data wind

Technical data wind	Unit	hero.wind
Generator type		DC
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	mm <sup>2</sup>	6000
Number of blades		9
Number of generators/module		2
Open circuit voltage U <sub>oc</sub>	V	36
Voltage U <sub>mp</sub>	V	24
Short circuit current I <sub>sc</sub>	A	1
Current I <sub>mp</sub>	A	0.5
Efficiency	%	30
Thermal insulation rear panel (optional)	mm	15

U <sub>mp</sub>	Instantaneous maximum voltage or nominal voltage of the module
U <sub>oc</sub>	Voltage in volts without load, or open circuit voltage
V	Volt - electrical voltage
VDC	Rated voltage in DC
W/(m <sup>2</sup> 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