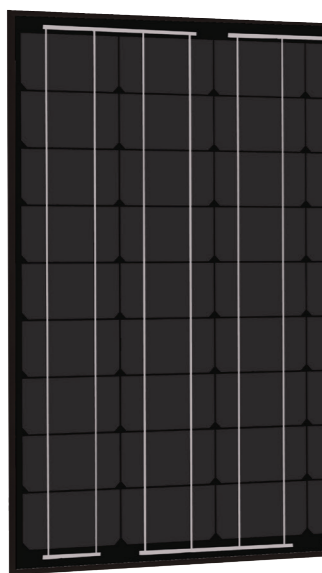


## UNISUN M



**Monocrystalline module:**  
series connections on the front face of the cells



10% of the surface is shaded by the electrical connections

ex. panels with 125 mm x 125 mm cells

intensity (Imp)	2,5-2,8 A
voltage (Vmp)	0,5-0,52 V
electrical contact	front contact

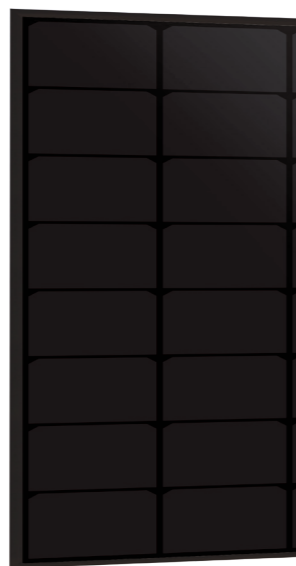
cell efficiency **20,5%**

number of cells necessary for battery charging  
36 cells (36 x 0,5 V) = 18 V

compactness of panel ++

saving money +++

## UNISUN BC



**Back contact module:**  
series connections on the back of the cells



No areas covered on the surface

ex. panels with 125 mm x 125 mm cells

intensity (Imp)	3,2-3,3 A
voltage (Vmp)	0,56-0,57 V
electrical contact	back contact

cell efficiency **23-24%**

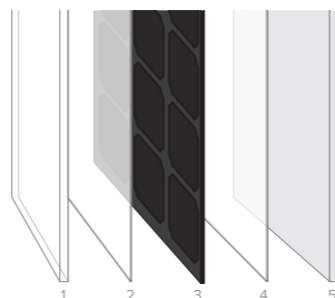
number of cells necessary for battery charging  
32 cells (32 x 0,57 V) = 18 V

panel compactness +++

saving money ++



### HIGH QUALITY STRUCTURE



1. Tempered glass 3.2mm, high transmissibility (low iron content)
2. EVA Resin 0,45mm
3. Highly efficient cells
4. EVA Resin 0,45mm
5. Frame (anodised aluminium)

### QUICK CONNECTORS



### ANTI HOT-SPOT



Protection against Hot-spots and surges

## UNISUN M & BC rigid solar panels

# HIGH EFFICIENCY

UNISUN is the range of high performance monocrystalline panels for leisure applications (boating and camping-car), isolated sites or signage.

Their multi-layer structure guarantees exceptional yields, even in very low sunlight conditions.

The thickness of their aluminum frame (35 or 40 mm) allows a better heat dissipation and enabling increased power.

On the surface, their high transmissibility tempered glass and their anodized aluminum frame protect them from external attacks (shocks, oxidation, corrosion)

Their modular design simplifies scaling up power out through either series or parallel connection, facilitate by their fast solar connectors.

The UNISUN range is available in standard monocrystalline cells and back contact monocrystalline cells. UNISUN Back Contact (electrical contact at the back) has the entire cell surface to capture light energy.

With the same power, thanks to their higher efficiency (power/surface ratio), back contact panels offer the advantage of being more compact and therefore ideal for applications where space or weight are criteria of choice.

For more aesthetics and sobriety, the standard UNISUN monocrystalline panels from 50W are equipped with the premium design "Black Backsheet". (black background).



Quality guaranteed by Uniteck  
Made in P.R.C.



EN61215 et EN61730

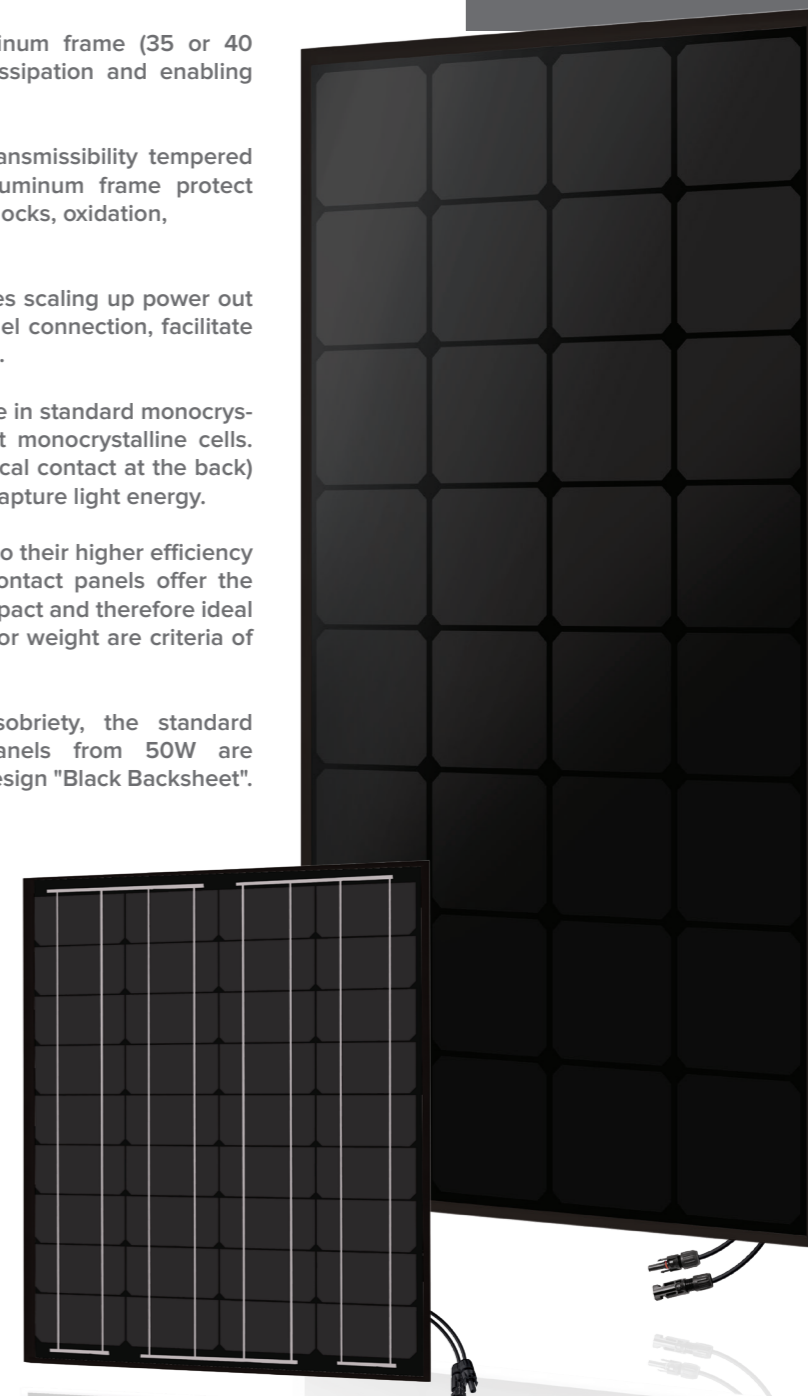


Highly efficient cells

Excellent impact and weight resistance (3.2 mm tempered glass + aluminum frame)

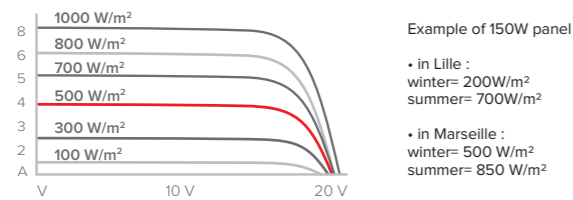
TÜV certified waterproof junction box with hot-spot protection

Exceptional output even under weak light



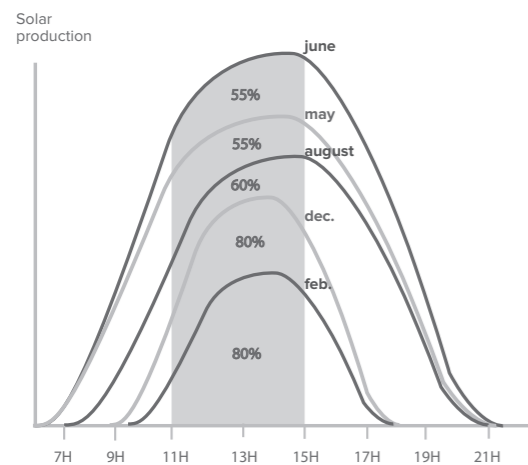
## SOLAR PRODUCTION EXPLANATION

**i** Intensity/voltage curve (eg. panel of 150W) depending on solar radiation W/m<sup>2</sup>



With solar radiation in Marseille, during winter, a solar panel will produce 50% of its power (=500W/m<sup>2</sup>)

**i** Distribution of daily solar production in France



The solar production has a Gaussian curve (bell-shaped curve), with a sunlight main period between 11 a.m. and 3 p.m. During winter, 80% of the production is made during this period when the data is between 50% and 60% during summer (it is because the sunlight period is more spread).

**i** Average coefficient of solar production in France.

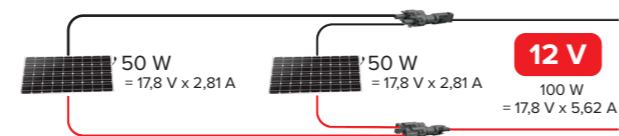
	Lille	Bordeaux	Marseille
January	x 0,7 - 1	x 1 - 1,5	x 1,5 - 2
February	x 1 - 1,5	x 1,5 - 2,5	x 2 - 3
March	x 2 - 2,5	x 3 - 3,5	x 3 - 4
April	x 3 - 3,5	x 3,5 - 4	x 4 - 5
May	x 3 - 4	x 4 - 5	x 4,5 - 6
June	x 4 - 4,5	x 4 - 6	x 5 - 6,5
July	x 4 - 4,5	x 4 - 6	x 5 - 7
August	x 3,5 - 4	x 4 - 5	x 4,5 - 6
September	x 2,5 - 3	x 3,5 - 4	x 4 - 4,5
October	x 1,5 - 2	x 2 - 2,5	x 2,5 - 3
November	x 0,7 - 1	x 1 - 1,5	x 1,5 - 2,5
December	x 0,5 - 0,7	x 0,8 - 1,5	x 1,5 - 2

In July a panel in Marseille will produce from 5 to 7 times its power (eg. for a panel of 100W = 500 to 700Wh/j)

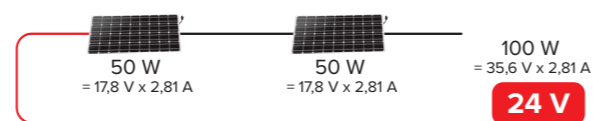


## UPGRADABLE COMBINATION

Parallel connection: for more power (Watt)

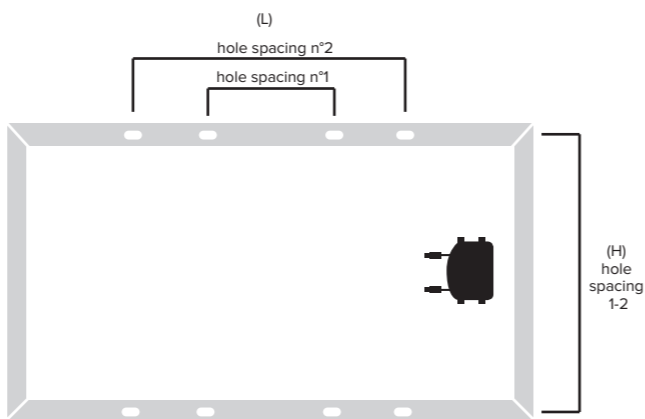


Series connection: for your 24V batteries



	20 W	40 W	100 W	150 W	300 W
UNISUN 20.12M	x1	x2	-	-	-
UNISUN 50.12M	-	-	x2	x3	-
UNISUN 150.12M	-	-	-	-	x2
UNICONNECT 1.6	x1	x1	x1	x1	x1
Parallel connectors kit	-	2 pan.	2 pan.	3 pan.	2 pan.

## HOLE SPACING ADAPTED TO UNITECK MOUNTING BRACKETS



hole diam. : 14 x 9 mm (excepted UNISUN 5.12M ø 5mm)

## UNISUN M & BC rigid solar panels

	UNISUN 5.12 M	UNISUN 10.12 M	UNISUN 10.24 M	UNISUN 20.12 M	UNISUN 20.24 M	UNISUN 30.12 M
	Ref 0491	Ref 0798	Ref 1436	Ref 0071	Ref 0804	Ref 0842

### Electrical performance

	5 W	10 W	10 W	20 W	20 W	30 W
Max. power (Pm)*	5 W	10 W	10 W	20 W	20 W	30 W
Power tolerance*	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %
Battery charge	12 V	12 V	24 V	12 V	24 V	12 V
Technology	mono	mono	mono	mono	mono	mono
Voltage at max. power (Vmp)*	19,4 V	17,6 V	35,2 V	17,8 V	35,2 V	17,8 V
Intensity at max. power (Imp)*	0,26 A	0,57 A	0,29 A	1,12 A	0,57 A	1,69 A
Voltage in open circuit (Voc)*	22,9 V	21,77 V	43,54 V	22,3 V	43,54 V	22,3 V
Intensity in short circuit (Icc/ ISC)*	0,27 A	0,65 A	0,33 A	1,21 A	0,65 A	1,82 A
Cell efficiency	20,60%	18,4%	18,4%	20,60%	20,60%	20,60%
Module efficiency*	7,56%	11,52%	11,52%	12,65%	12,65%	11,86%

### Maximum battery charging power\*\*\*

12V Battery	with PWM controller	0,23 A	0,46 A	n.a.	0,90 A	n.a.	1,35 A
	with MPPT controller	0,33 A	0,65 A	0,65 A	1,30 A	1,30 A	1,96 A
24V Battery	with PWM controller	n.a.	n.a.	0,23 A	n.a.	0,46 A	n.a.
	with MPPT controller	n.a.	n.a.	0,33 A	n.a.	0,65 A	n.a.

### Temperature characteristics

Operating temperature	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C
NOCT / TUC**	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C
Temperature coefficient	Pm	-0,43%/°C	-0,48%/°C	-0,48%/°C	-0,48%/°C	-0,43%/°C
	Voc	-0,34%/°C	-0,34%/°C	-0,34%/°C	-0,34%/°C	-0,34%/°C
	Icc	0,05%/°C	0,037%/°C	0,037%/°C	0,037%/°C	0,037%/°C

### Mechanical characteristics

Anodised aluminium frame	yes	yes	yes	yes	yes	yes
Black backsheet design	yes	no	no	no	yes	yes
Hole spacing for fixing (mm)	n°1 - L x H	154 x 195	120 x 260	120 x 260	120 x 260	120 x 260
	n°2 - L x H	-	183 x 260	183 x 260	420 x 260	420 x 260
Cable length (with connectors)	-	-	-	-	-	-
Module dimensions (mm)	216x306x18	310x280x35	310x280x35	510x310x35	660x310x35	310x680x35
Module weight	0,8 kg	1,3 kg	1,3 kg	2 kg	2 kg	3,1 kg

### Product warranty

Period	5 years	5 years	5 years	5 years	5 years	5 years
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\*According to standard test conditions (STC): irradiance 1000 W/m<sup>2</sup>, AM= 1,5, cell temperature 25°C.  
 \*\* Nominal Operating Cell Temperature: Irradiance 800 W/m<sup>2</sup>, wind speed 1 m/s, ambient temperature 25°C.  
 \*\*\*According to NMOT standard- Nominal Module Operating Temperature (=test condition in real situation): irradiance 800W/m<sup>2</sup>, ambiante temperature 20°C, wind speed 1 m/s

## UNISUN M & BC rigid solar panels



	UNISUN 50.12 M Ref 0088	UNISUN 60.12 BC Ref 1238	UNISUN 50.24 M Ref 1870	UNISUN 80.12 M Ref 0095	UNISUN 100.12 M Ref 0446	UNISUN 120.12 BC Ref 1245	UNISUN 100.24 M Ref 1443	UNISUN 150.12 M Ref 0453	UNISUN 165.12 BC Ref 1528	UNISUN 150.24 M Ref 1887	UNISUN 200.12 BC Ref 3324	UNISUN 200.24 M Ref 1337	UNISUN 300.12 M Ref 2013	UNISUN 400.24 M Ref 5052
<b>Electrical performance</b>														
Max. power (Pm)*	50 W	55 W	50 W	80 W	100 W	120 W	100 W	150 W	165 W	150 W	200 W	200 W	300 W	390 W
Power tolerance*	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %	0/+3 %	+/-3 %	+/-3 %
Battery charge	12 V	12 V	24 V	12 V	12 V	12 V	24 V	12 V	12 V	24 V	12 V	12/24 V	12 V	12/24 V
Technology	mono	back contact	mono	mono	mono	back contact	mono	mono	back contact	mono	back contact	mono	mono	mono
Voltage at max. power (Vmp)*	17,8 V	18,6 V	36,6 V	17,8 V	17,8 V	19,8 V	36,6 V	17,8 V	27,9 V	38,9 V	34 V	35,6 V	30,5 V	41,8 V
Intensity at max. power (Imp)*	2,81 A	2,96 A	1,4 A	4,49 A	5,62 A	6,06 A	2,81 A	8,43 A	5,38 A	3,99 A	6,24 A	5,62 A	9,82 A	9,34 A
Voltage in open circuit (Voc)*	22,3 V	21,8 V	42,7 V	22,3 V	22,3 V	23,3 V	42,7 V	21,3 V	33,5 V	45,9 V	40,0 V	42,7 V	35,5 V	48,9 V
Intensity in short circuit (Icc/ ISC)*	3,03 A	3,13 A	1,5 A	4,85 A	6,07 A	6,42 A	3,04 A	9,10 A	5,81 A	4,22 A	5,88 A	6,07 A	11,1 A	9,8 A
Cell efficiency	20,60%	23,80%	20,60%	20,60%	20,60%	24,40%	20,60%	20,60%	24,4%	20,60%	23,80%	20,60%	20,20%	22,70%
Module efficiency*	14,20%	18,18%	14,20%	15,15%	17,32%	20,78%	15,15%	16,58%	20,54%	16,58%	20,43%	15,80%	19,60%	20,47%
<b>Maximum battery charging power***</b>														
12V battery	with PWM controller	2,25 A	2,50 A	n.a.	3,88 A	4,86 A	n.a.	7,28 A	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	with MPPT controller	3,26 A	3,59 A	3,26 A	5,22 A	6,52 A	7,17 A	6,52 A	9,78 A	10,76 A	9,78 A	13,04 A	13,04 A	19,57 A
24V battery	with PWM controller	n.a.	n.a.	1,20 A	n.a.	n.a.	n.a.	n.a.	n.a.	3,60 A	n.a.	4,86 A	n.a.	7,84 A
	with MPPT controller	n.a.	n.a.	1,63 A	n.a.	n.a.	n.a.	n.a.	n.a.	4,89 A	n.a.	6,52 A	n.a.	13,04 A
<b>Temperature characteristics</b>														
Operating temperature	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C	-40/+85°C
NOCT / TUC**	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C	45 ±2°C
Temperature coefficient	Pm	-0,43%/°C	-0,3%/°C	-0,43%/°C	-0,43%/°C	-0,43%/°C	-0,43%/°C	-0,48%/°C	-0,3%/°C	-0,43%/°C	-0,3%/°C	-0,43%/°C	-0,43%/°C	-0,48%/°C
	Voc	-0,34%/°C	-0,28%/°C	-0,34%/°C	-0,34%/°C	-0,28%/°C	-0,28%/°C	-0,34%/°C	-0,28%/°C	-0,34%/°C	-0,28%/°C	-0,34%/°C	-0,34%/°C	-0,34%/°C
	Icc	0,05%/°C	0,05%/°C	0,05%/°C	0,05%/°C	0,05%/°C	0,05%/°C	0,05%/°C	0,037%/°C	0,05%/°C	0,05%/°C	0,05%/°C	0,05%/°C	0,037%/°C
<b>Mechanical characteristics</b>														
Anodised aluminium frame	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Black backsheet design	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Hole spacing for fixing (mm)	n°1 - L x H	120 x 500	120 x 500	120 x 500	127 x 500	127 x 500	127 x 500	127 x 500	600 x 635	600 x 626	600 x 626	600 x 626	800 x 768	720 x 950
	n°2 - L x H	420 x 500	420 x 500	420 x 500	860 x 500	710 x 500	860 x 500	860 x 500	1100 x 635	1100 x 626	1100 x 626	1100 x 626	1300 x 768	1220 x 950
Cable length (with connectors)	900 mm	900 mm	900 mm	900 mm	900 mm	900 mm	900 mm	900 mm	900 mm	900 mm	900 mm	900 mm	900 mm	900 mm
Module dimensions (mm)	640×550×35	550×550×35	660×550×35	960×550×35	1050×550×35	1050×550×35	1200×550×35	1340×675×35	1190×675×35	1500×675×35	1450×675×40	1580×808×40	1500×990×40	1680×1134×40
Module weight	4,1 kg	3,8 kg	4,1 kg	6,3 kg	7,0 kg	7,0 kg	7,5 kg	9,8 kg	9,3 kg	10,8 kg	12,9 kg	13,6 kg	15,5 kg	17,0 kg
<b>Product warranty</b>														
Period	5 years	5 years	5 years	5 years	5 years	5 years	5 years	5 years	5 years	5 years	5 years	5 years	5 years	5 years

\*According to standard test conditions (STC): irradiance 1000 W/m<sup>2</sup>, AM= 1,5, cell temperature 25°C.  
 \*\* Nominal Operating Cell Temperature: Irradiance 800 W/m<sup>2</sup>, wind speed 1 m/s, ambient temperature 25°C.  
 \*\*\*According to NMOT standard- Nominal Module Operating Temperature (=test condition in real situation): irradiance 800W/m<sup>2</sup>, ambiante temperature 20°C, wind speed 1 m/s