AGUIDROVERT SOLAR
c/ Cervantes 20, Zaragoza 50.006 (Spain)
Tel.: 976302135 Fax: 976468085
www.aguidrovert.com info@aguidrovert.com

Kloben Solar Evolution

Fact Sheet Sky CPC 58

SOLAR KEYMARK
N° 011-7S124 R

Principle:

The CPC 58 solar vacuum tube collector is composed of a series of borosilicate glass pipes with double air gap, welded at the end, inside which a vacuum is closed. The internal air gap is made selective due to the absorption of solar electromagnetic radiation through a multilayer metallization called "CERMET", created using completely recyclable products. The absorption unit is made up of a copper circuit bent into a "U" shape, positioned in a perfect contact with aluminium heat absorber, which increase the heat exchange surface. Each unit is contained in a glass pipe, and is then connected in parallel to a collector situated on the head of the panel, which collects the fluid flowing through every circuit.

Construction data:

Vacuum tube:	Borosilicate glass pipes with double air gap welded at the end. Dimension outside tube 58 mm wall thickness 1,7 mm, inner tube 47 mm
Vacuum:	$<10^{-3}$ mbar
Absorber:	High selective coating CERMET, Absorption 94 %; Emission 6 %
CPC reflector	Low iridescence rolled section created to reflect with percentages greater than 90% of the total light, taking advantage of the Compound Parabolic Concentrator system.
Collector casing:	Electro-coloured aluminium, fully insulated with special non-flammable class 0 (ISO - DIS 1182.2) insulation.
Connections:	2 x ¾" female thread 24 x 1,5 mm. Includes pre-mounted reinforcing sleeve, cutting ring and screw-nut on Ø 18 mm cooper tube. *Note: the thread 24 x 1,5 mm is not compatible to the euro cone standard.*

Technical Data:

Number of pipes	12	18	21
Gross area (m^2)	2,16	3,22	3,75
Aperture area (m^2)	1,89	2,84	3,31
Absorption area (m^2)	0,81	1,22	1,42
Empty weight (kg)	43	65	76
Liquid content (lt)	1,74	2,6	2,68
Width (mm):	1358	2018	2348
Height (mm):	1630		
Thickness (mm):	140		
Maximum working pressure (bar)	6		
Maximum tilt angle	90ª		
Minimum tilt angle	0ª		
Testing pressure (bar)	9		

AGUIDROVERT SOLAR
c/ Cervantes 20, Zaragoza 50.006 (Spain)
Tel.: 976302135 Fax: 976468085
www.aguidrovert.com info@aguidrovert.com

Kloben Solar Evolution

Fact Sheet Sky CPC 58

Efficiency data according to EN 12975-2:			
Test report:	07COL623/1 ITW Stuttgart		
Efficiency date referred to:	Aperture area		
Efficiency η_0:	0,718		
Heat transfer coefficient a_1:	0,974 W/m²K		
Heat transfer coefficient a_2:	0,005 W/m²K²		
*)Stagnation temperature	249 °C		
	12 CPC 58	18 CPC 58	21 CPC 58
**) Peak Power W_{peak}	1357 W	2039 W	2377 W

*) Irradiance of 1000 W/m² and an ambient temperature of 30°C

**) G= 1000 W/m², (ϑ_k - ϑ_a)=0 per collector unit

Power output per collector 12 CPC 58 in Watt, according to EN 12975-2			
	Irradiance W/m²		
*) ϑ_k - ϑ_a	400 W/m²	700 W/m²	1000 W/m²
0	543	950	1357
20	502	909	1316
40	454	861	1268
60	398	805	1213
80	335	742	1149
100	264	671	1078

Power output per collector 18 CPC 58 in Watt, according to EN 12975-2			
	Irradiance W/m²		
*) ϑ_k - ϑ_a	400 W/m²	700 W/m²	1000 W/m²
0	816	1427	2039
20	755	1366	1978
40	682	1294	1906
60	599	1210	1822
80	503	1115	1727
100	397	1009	1621

Power output per collector 21 CPC 58 in Watt, according to EN 12975-2			
	Irradiance W/m²		
*) ϑ_k - ϑ_a	400 W/m²	700 W/m²	1000 W/m²
0	951	1664	2377
20	880	1593	2305
40	795	1508	2221
60	698	1411	2124
80	587	1300	2013
100	463	1176	1889

Prediction of the yearly energy gain

The prediction is based on the calculation of the yearly energy gain of the collector in a reference solar hot water system. This system is designed for a four-person-household. The calculations is done for aperture areas of 3, 4, 5 and 6 m² as well as for reference climate data of Würzburg with an annual radiation of 1212 kWh/m²a.

Aperture area 3	energy gain 733 kWh/m²a
Aperture area 4	energy gain 682 kWh/m²a
Aperture area 5	energy gain 612 kWh/m²a
Aperture area 6	energy gain 545 kWh/m²a

System data of the ITW reference solar hot water system:
Roof orientation: south, tilt angle equal to latitude; distance from tank to collector: 15 m; storage tank: 300 l with two coils, heated by the boiler: 135 l, storage temperature: 60°C; DHW demand: 200 l/day, hot water temperature: 45°C, cold water temperature: 10°C; annual consumption: 2936 kWh/a.

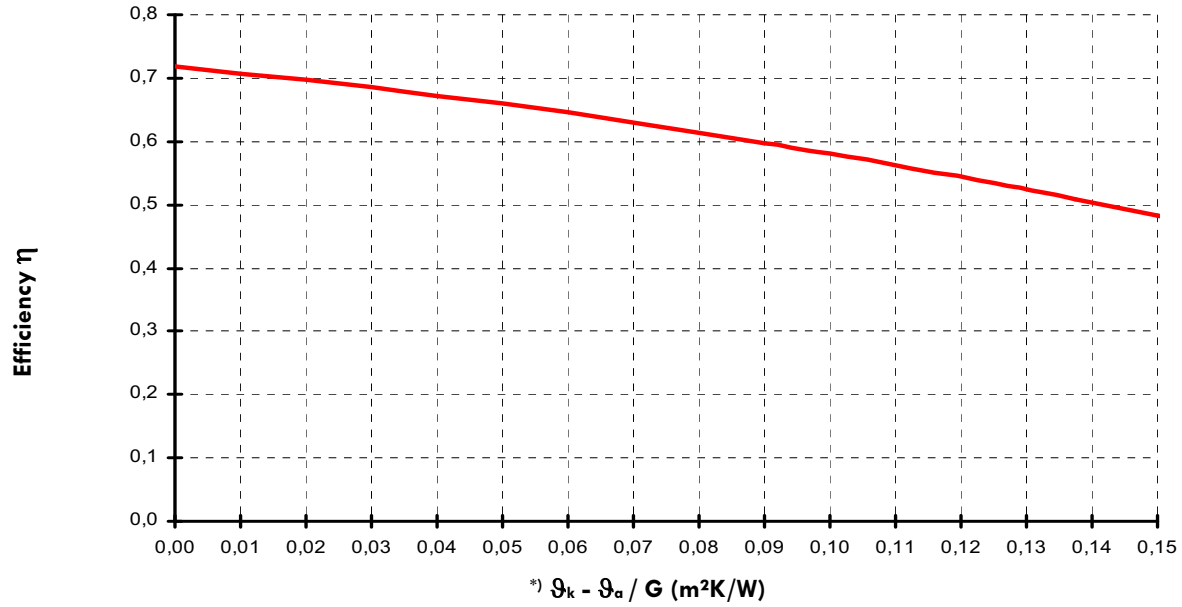
AGUIDROVERT SOLAR
c/ Cervantes 20, Zaragoza 50.006 (Spain)
Tel.: 976302135 Fax: 976468085
www.aguidrovert.com info@aguidrovert.com

Kloben Solar Evolution

Fact Sheet Sky CPC 58

Power curve according to EN 12975-2:

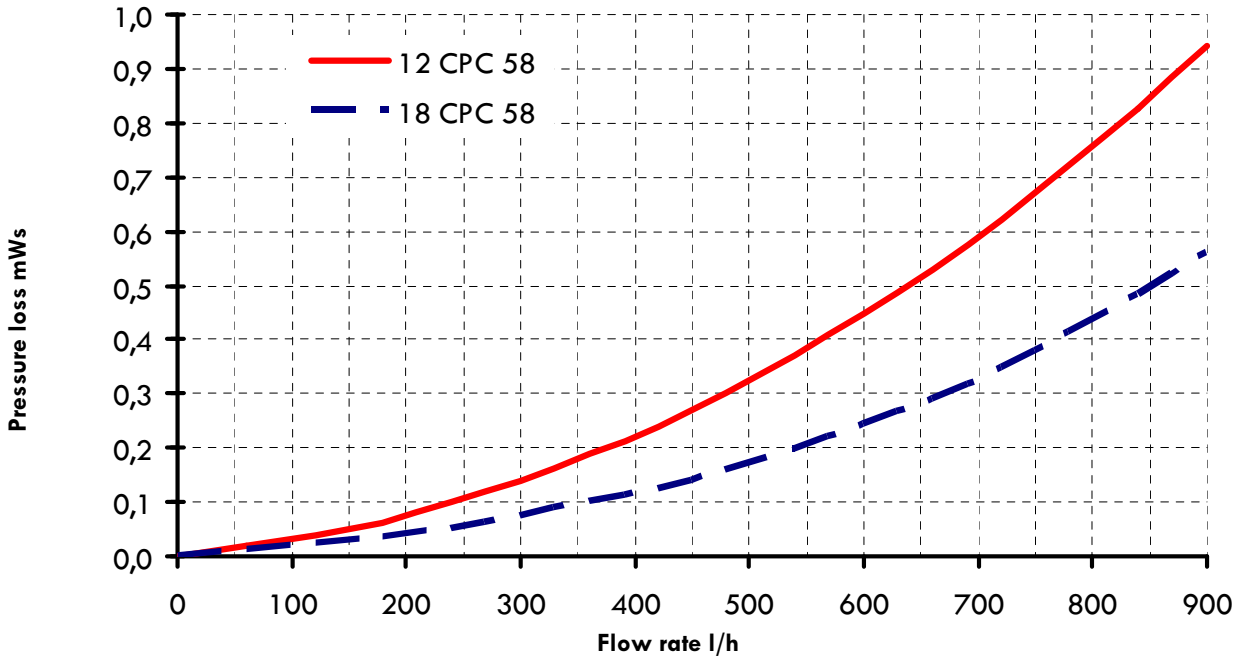
Referred to aperture area



*) $\vartheta_k - \vartheta_a$ Difference between the collector middle temperature and ambient temperature

Pressure losses:

Measured with water at temperature ϑ = 20°C



In case of more than one collector connected serially - to calculate the pressure loss - you have to define the flow rate for the whole system (specific flow rate in l/m²h multiplied by the collector area in m²), take the value from the diagram and multiply it by the number of collectors connected serially.

Example for calculation: E.g. 4 panels 12 CPC 58 connected serially = 1,89 m ² x 4 x 60 l/m²h = 454 lt/h. Value from the diagram 0,27 mWs x 4 = 1,08 mWs for the whole field of 4 panels.

AGUIDROVERT SOLAR
c/ Cervantes 20, Zaragoza 50.006 (Spain)
Tel.: 976302135 Fax: 976468085
www.aguidrovert.com info@aguidrovert.com

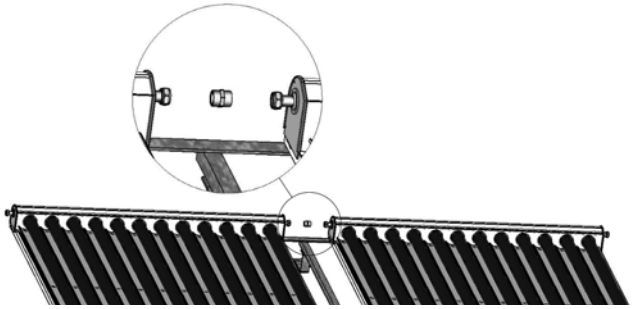
Kloben Solar Evolution

Fact Sheet Sky CPC 58

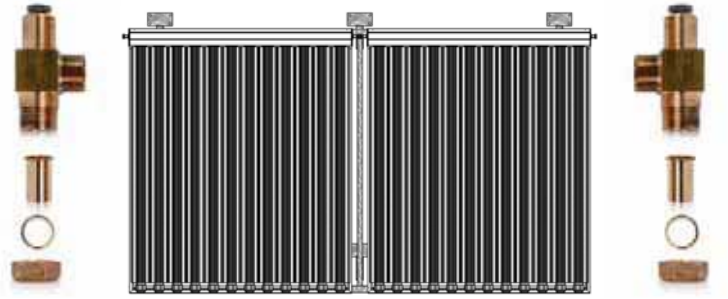
Connections

Connections	¾“ female thread. Pre mounted immersion sleeve, cutting ring and screw-nut on 18 mm copper tube (see below)

The CPC 58 is delivered with the connector needed between two collectors if connected serially. Up to 4 collectors could be connected serially.



To connect a field of solar collectors you need the connection kit with manual bleed valve.



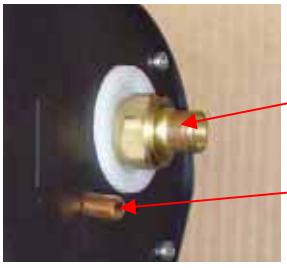
Other connections possibilities without manual bleed valve. Thread 24 x 1,5 mm

Connection nipple with flat stroke ¾” male gas thread for connecting the solar collectors to the pre-insulated stainless steel piping.

Connection nipple with ¾” cone male gas thread for connecting the solar collectors to cooper piping with cutting screw connectors.

Monting of the collector sensor

To install the collector sensor use the sensor pocket, witch is available on every collector on both sides.



Note:

- The flow direction of the CPC 58 could be done from left or from the right side. Recommended is always to consider the shorter length to be the flow (hot side) because of lesser thermal loss.
- The collector sensor should be installed on the flow side of the collector (hot output) to guarantee the perfect control of the system.

AGUIDROVERT SOLAR
c/ Cervantes 20, Zaragoza 50.006 (Spain)
Tel.: 976302135 Fax: 976468085
www.aguidrovert.com info@aguidrovert.com

Kloben Solar Evolution

Fact Sheet Sky CPC 58

Hydraulic connection an pipe work

Until 4 collectors could be connected serially (fig.1). In case of bigger solar fields a parallel connection with inverted return is recommended according to the figure 2.

Fig. 1

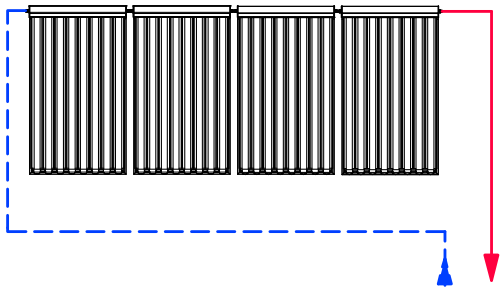
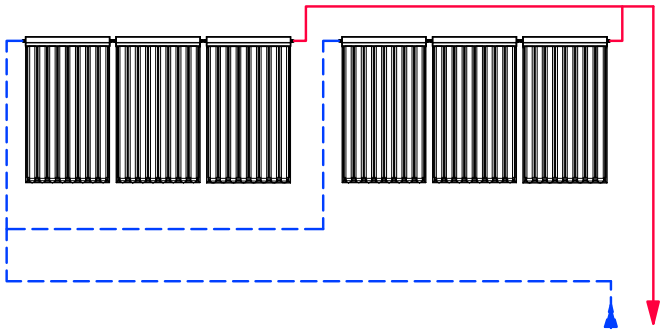


Fig. 2



To ensure the system works correctly it is necessary to balance hydraulically the collector fields. They are hydraulically balanced when the flow and return pipes have the same length figures 3 and 4 agreed to the Tichelmann principle. In case a Tichelmann is not possible appropriate balancing valve have to be used.

Fig 3

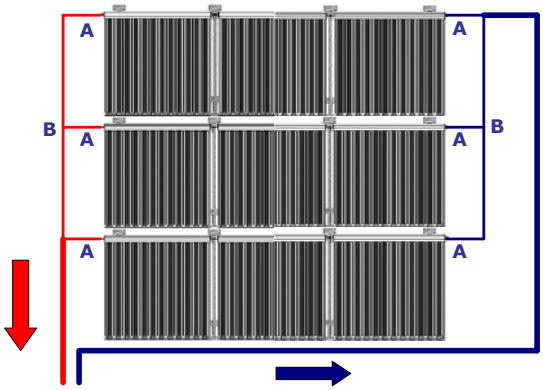
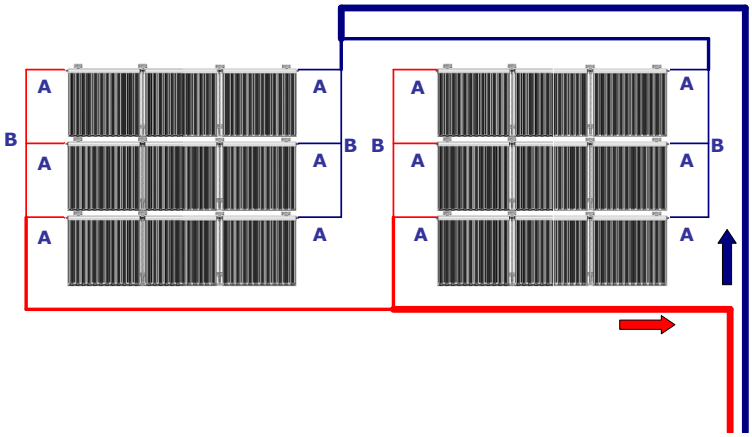
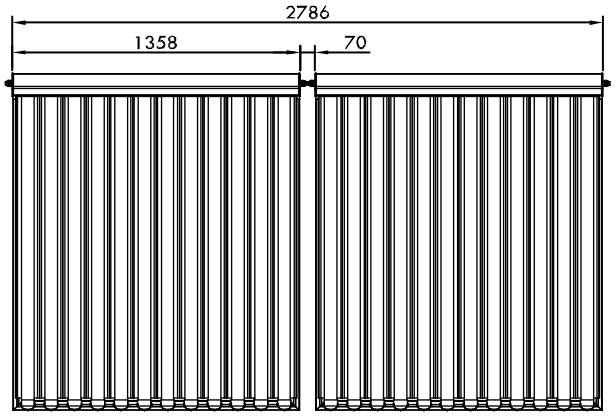


Fig.4



Measurement 12 CPC 58



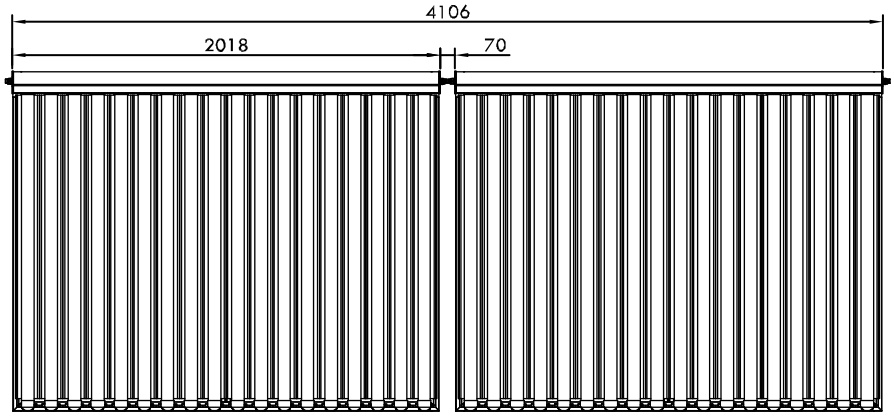
Number of collectors	Dimension of the collector field
2 unit	2786 mm
3 unit	4214 mm
4 unit	5642 mm

AGUIDROVERT SOLAR
c/ Cervantes 20, Zaragoza 50.006 (Spain)
Tel.: 976302135 Fax: 976468085
www.aguidrovert.com info@aguidrovert.com

Kloben Solar Evolution

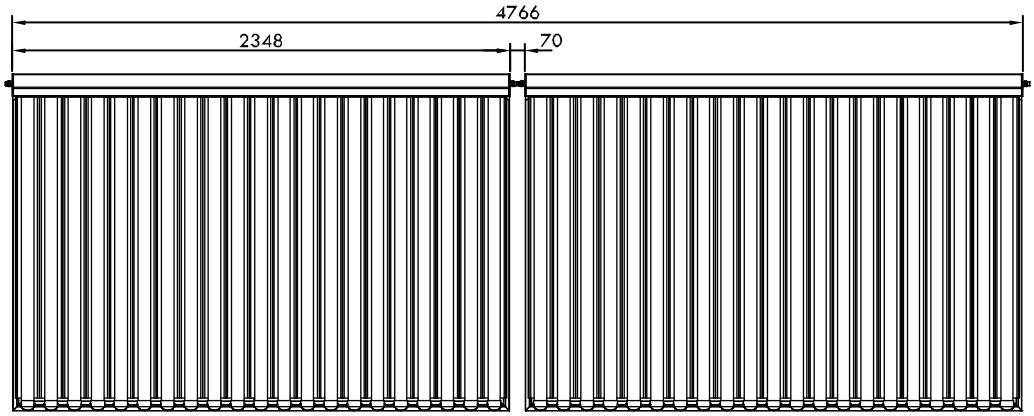
Fact Sheet Sky CPC 58

Measurement 18 CPC 58



Number of collectors	Dimension of the collector field
2 unit	4106 mm
3 unit	6194 mm
4 unit	8282 mm

Measurement 21 CPC 58



Number of collectors	Dimension of the collector field
2 unit	4766 mm
3 unit	7184 mm
4 unit	9602 mm