

Guidelines for installers



01/2011

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- The study contains preliminary assortments of collectors and sub-assemblies of the installation.
- One should design the ultimate selection and the assembly of devices on the base technical – executive (individual for every investment)
- The study isn't replacing detailed recommendations of sub-assemblies contained in operating manuals of the solar set.

1. Selection of the area of collectors

Degree of cover the demand	Netto surface of collector [m ² /person]	
	80l/twenty-four hours/person temp. 40°C	50l/ twenty-four hours/person 40°C
60-70% - single-family building	1,4 – 1,65	0,9 – 1,05
50-60% - single-family building	1,2 – 1,4	0,75 – 0,9
40-50% - single-family building	0,95 – 1,2	0,6 – 0,75

The above table was prepared for the annual solar exposure 950 kWh/m² and cold water temperature 10°C

2. Selection of capacity of storage bin

Recommended capacity of storage bin.

Twenty four hours and temperature dem and for hot domestic water/person.	80l/twenty-four hours/person a temp. 40°C	50l/ twenty-four hours/person a temp. 40°C
Recommended capacity of storage bin [l/person]	95	60

Minimal capacity of storage bin is 40l on each 1m² netto surface of collector (at assuming the constant drawing of warm functional water.

3. Selection of connecting elements scheme

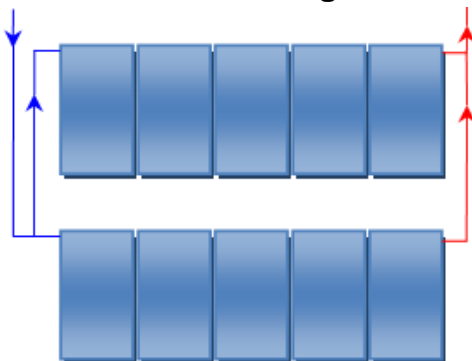
3.1 Connecting of collectors ES1V for vertical assembly with absorber as a sectional harp

3.1.1 Connecting to 5 collectors with absorber as a sectional harp ES1V.



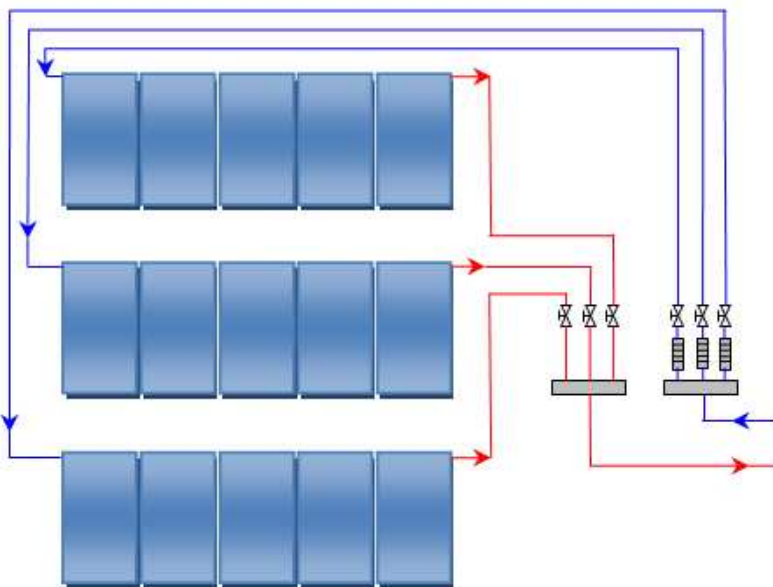
Collectors types ES1V can be connected in series area (batteries) max 5 collectors (Direction of the flow of the solar factor doesn't significant)

3.1.2 Connecting to 10 collectors with absorber as a sectional harp ES1V.



Connecting in Tichelman system should be used when more that 5 collectors are connected

3.1.3 Connecting to 10 collectors with absorber as a sectional harp ES1V.



If there are more than 10 collectors in instalation, distributor should be used. Distributor should be equipped in rotameters (for return) which indywidual area of collectores are connected with.

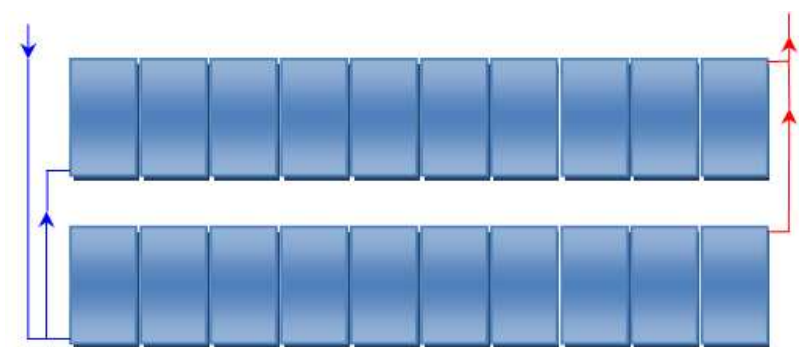
Attention: For the sake of minimizing losses of the warmth are recommending making the shortest power cords possibly (high parameter) – like in above pictures

3.2 Connecting of collectors ES2V with meander absorber for vertical

2.2 Connecting to 10 meander collectors ES2V.

Collectors of the type ES2V can be arranged into fields parallel (batteries) connections containing at the most 10 pieces of collectors in the case diagonal.

3.2.3 Connecting to 10 meander collectors ES2V..



Connecting in Tichelman system should be used when more than 10 collectors are connected

Single collectors are connected parallel area (to 10 pieces) and area are connected in Tichelman system in the way shown in the picture.

3.2.4 Connecting over 20 meander collectors ES2V..



If there are more than 10 collectors in installation, distributor should be used. Distributor should be equipped in rotameters (for return) which individual area of collectors are connected with.

Attention: For the sake of minimizing losses of the warmth are recommending making the shortest power cords possibly (high parameter) – like in above pictures

4. The diameter of copper pipes and the required rate of flow.

ES1V/2,0 – collector with harp absorber, surface 2,0 m2										
Quantity of collectors ES1V/2,0 [pieces]	1	2	3	4	5	6	7	8	9	10
Min.quantity of batteries	1					2				
The diameter of manifold	15x1,0			18x1,0			22x1,0			
Optimum flow [l/min]	1,0 – 1,5					2,0 – 3,0				

ES1V/2,65 – collector with harp absorber, surface 2,65 m2										
Quantity of collectors ES1V/2,65 [pieces]	1	2	3	4	5	6	7	8	9	10
Min.quantity of batteries	1					2				
The diameter of manifold	15x1,0			18x1,0			22x1,0			
Optimum flow [l/min]	1,25 – 1,75					2,5 – 3,5				

ES2V/2,65 – collector with meander absorber, surface 2,65 m2											
Quantity of collectors ES1V/2,65 [pieces]	1	2	3	4	5	6	7	8	9	10	
Min.quantity of batteries	1										
The diameter of manifold	15x1,0		18x1,0		22x1,0			28x1,0			
Optimum flow [l/min]	1,25 – 1,75	2,5- 3,5	3,75- 5,25	5,0- 7,0	6,25- 8,75	7,5- 10,5	8,75- 12,25	10,0- 14,0	11,25- 15,75	12,5- 17,5	

If on the solar controllers there is a possibility of programming the flow of min and max, recommend -

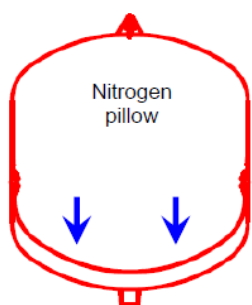
Programming the lower limit of the optimum flow as a the minimum, and as the maximum of the upper limit of the optimum flow

-It is recommended to set the upper limit of the optimum flow on rotameter.

5. The capacity of expansion tanks

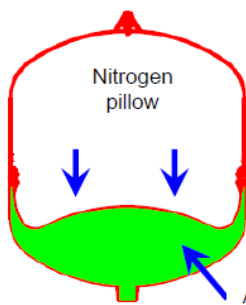
Before starting the solar installation one should place the preliminary pressure of the air bag in expansion tank!

Solar installation not-filled.
Factory preliminary pressure of the nitric pillow:
1,5bar from S8 to S33
3,0bar from S50 to S600
One should place according to the pattern:
 $p = (1,5+0,1 \cdot h[m])$ [bar]



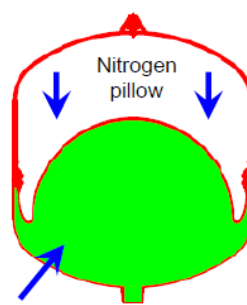
Heating factor (solar Liquid)

Solar installation filled, in the cold state, under the minimal pressure



Heating factor (solar Liquid)

Solar installation filled, at the highest temperature of the solar factor, under the maximum pressure



Heating factor (solar Liquid)

Amount of solar liquid

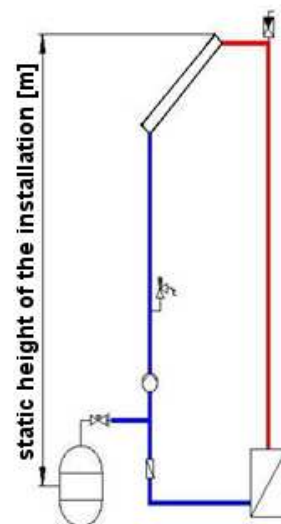


Table of the preliminary assortment of the diaphragm expansion tanks for the installation about the static height up to 12 m

The capacity of expansion tanks [dm ³]	Type of collectors	
	ES1V/2,0	ES1V/2,65 ES2V/2,65 ES2H/2,65
	Quantity of collectors [pieces]	Quantity of collectors [pieces]
25	2	1
33	3	2
50	4-5	3-4
80	6-8	5
100	9-10	6-8

6. Table of the preliminary selection of the solar installation.

COLLECTOR ES1V/2,0

Approximate number of people (80l/persons, 40°C)	Quantity of collector ES1V/2,0	Quantity of batteries	The diameter of manifold	The capacity of expansion tanks (statyczna <12m)	Minimal capacity of the tank	Optimal flow
	[pieces]	[kpl]	[mm]	[dm3]	[dm3]	[l/min]
2-3	2	1	15x1,0	25	200	1-1,5
3-4	3	1	15x1,0	33	300	1-1,5
5	4	1	18x1,0	50	400	1-1,5
6-7	5	1	18x1,0	50	500	1-1,5

COLLECTOR ES1V/2,65

Approximate number of people (80l/persons, 40°C)	Quantity of collector ES1V/2,0	Quantity of batteries	The diameter of manifold	The capacity of expansion tanks (h statyczna <12m)	Minimal capacity of the tank	Optimal flow
	[pieces]	[kpl]	[mm]	[dm3]	[dm3]	[l/min]
3-4	2	1	15x1,0	33	300	1,5-2,0
5	3	1	15x1,0	50	500	1,5-2,0
6-7	4	1	18x1,0	50	750	1,5-2,0
8	5	1	18x1,0	80	750	1,5-2,0

COLLECTOR ES2V/2,65

Approximate number of people (80l/persons, 40°C)	Quantity of collector ES1V/2,65	Quantity of batteries	The diameter of manifold	The capacity of expansion tanks (h statyczna <12m)	Minimal capacity of the tank	Optimal flow
	[pieces]	[kpl]	[mm]	[dm3]	[dm3]	[l/min]
3-4	2	1	15x1,0	33	300	2,5-3,5
5	3	1	18x1,0	50	500	3,5-5,0
6-7	4	1	18x1,0	50	750	5,0-7,0
8	5	1	22x1,0	80	750	6,0-8,5

If on the solar controllers there is a possibility of programming the flow of min and max, recommend -

Programming the lower limit of the optimum flow as a the minimum, and as the maximum of the upper limit of the optimum flow

-It is recommended to set the upper limit of the optimum flow on rotameter.

Detailed selection of solar instalation on Ensol collectores is possible to achive in Polysun programs or Getsolar.

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01/2011**