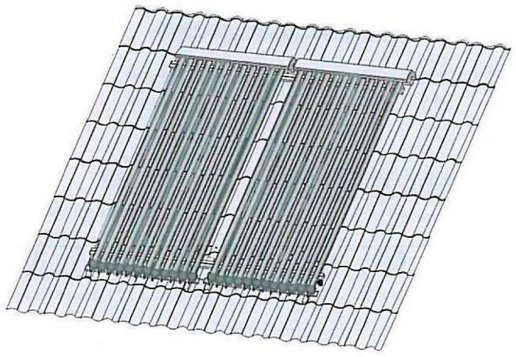
Solar thermal collector



INSTALLATION MANUAL

DIN EN 12975-1:20006-6
DIN EN 12975-2:20006-6

1.Important Information

1.1. Local standards

Installation must be completed in accordance with the relevant local standards and regulations.

1.2.Qualified Installer

Installation must be completed by qualified plumbing professionals.

1.3. Pressure and Temperature Control and Relief.

Solar loop should be designed for normal operation at <600kpa via use of a pressure limiting (pressure reduction) valve on the mains cold supply line. System design must provide mean for allowing pressure release at no more than 800kpa (113psi) and hot water dumping from the solar loop or storage tank once the temperature reaches 99℃(210F). It is recommended that the lever on the pressure and temperature relief valve (PTRV) be operated once every 6 months ensure reliable operation. It is important to raise and lower the lever gently.

1.4. Water quality

Water in direct flow through the manifold header must firstly meet potable water requirement and in addition the following:

Total dissolved solids < 600mg/litre or p.p.m
Total hardness < 200mg/litre or p.p.m
Chloride < 250mg/litre or p.p.m
Magnesium < 10mg/litre or p.p.m

In areas with hard water (>200ppm), line scale may from inside in header pipe. In such regions, it is advisable to in stall a water softening device to ensure the long term efficient operation of the collector, or use a closed loop for the solar circulation loop. If using a glycol/water must meet the above requirements, and the glycol must be changed periodically to prevent the glycol from becoming acidic.

1.5. Metallic corrosion

Both copper & stainless steel are susceptible to corrosion when high concentrations of chloride are present. The solar collector may be used for heating of spa or pool water, but levels of free chorine must not exceed 2ppm.in addition the warranty provided on the header when using for spa or pool heating is 2 years, which is the standard for spa and pool heaters. Chloride level present in most reticulated pubic potable water supplies are safe for use in the collector provided there is no use of bore waters in the reticulated supply.

1.6. Freeze Protection

Freeze protection should be in corporate into the system by use of a low manifold temperature setting on the solar controller, which turns on the pump if the manifold drops below a preset level (eg5℃/41F). Alternatively a closed loop filled with a glycol–water mix may be used to provide freeze protection. Evacuated tubes are not susceptible to dam–age in cold weather, and heat pipes are protected against damage caused by freezing of the water inside.

1.7. Hail resistance

The glass evacuated tubes are surprisingly strong and able to handle significant impact stresses once installed. Testing and impact stress modeling proves that the tubes are able to withstand impact from hail up to 25mm/1''in diameter when installed at angle of 40°or greater. The ability of the evacuated tubes to withstand impact from hail is greater in–fluenced by the angle of impact and so installing the collectors at low angles do reduce their impact resistance. How–ever, even when laying flat, impact by hail up to 20mm/3/4''in size will not cause breakage.

It is recommended that in areas prone to large hail (>20mm3/4'')the solar collector should be installed at an angle of 40°or greater to provide optimum protection. As many populated areas in the world fall within the latitude of 30° – 70° this angle is generally a common installation anyway.If in the unlikely circumstance that a tube should become broken it can be easily replaced in a matter of minutes. The solar collector can still function properly with one or more broken tubes, however a reduction in heat output will result (depending upon how many tube are broken).

1.8. Lightning protection

The collectors should be done lightning protecting to avoid the lightning attacking. The lightning rod is necessary which should be 1.5m higher and 3 m far away from the solar collectors. For any problems that involve plumbing or electrical connections the services of a qualified professional must be employed.

2.Unpack and inspect

2.1. Tube inspection

Open the tube box(es), which contain both evacuated tubes and heat pipes. Check to make sure the evacuated tubes are all intact and the bottom of each tube is still silver. If a tube has a while or clear bottom, it is damaged and should be replaced. Each evacuated tube contains a pair of metal heat transfer fins. As soon as the evacuated tubes are removed from the box, please put on the rubber tube caps, which are located in the manifold box. This will protect the bottom tip of the glass tube from being broken if knocked. Do not remove the tubes to sunlight until you install hem, otherwise the inner tube and heat transfer fin will become very hot. The outer glass surface will not become hot.

3. Plumbing

3.1 Plumbing Connection

Once the frame has been mounted and the manifold attached, the manifold header may be connected to the system plumbing.

3.2 Choice of Piping Material

13mm OD, or 15mm OD copper piping is generally used for most solar collector installations. As the flow rate is slow, a large diameter pipe is unnecessary and will only increase system costs and heat loss.

3.3 Pressure Levels

Regardless of the installation configuration, pressure release values, expansion vessels and/or other pressure control devices must be installed. T he solar loop should be designed to operate at no more than 800kPa (PRV may be 850kPa). (800kPa =8bar=116psi) For installation where mains pressure water is used, the system should ideally be designed to operate at a pressure of <500kPa, achieved by use of a pressure limiting/reduction value.

3.4 Tempering value.

It is recommended, and may be required by regulations, that a temperature control device (tempering value) be fitted into the hot water pipe between the water heater and bathrooms and en–suites to reduce the risk of scalding. This is achieved by controlling the water temperature to below 50℃/122F (temperature may be adjustable).

3.5 Temperature Sensor Insertion

The solar controller's temperature sensor should be coated with a thick layer of thermal paste and inserted into the sensor port to the full depth. If the fit is too loose, slide a piece of copper plate or wire in beside the sensor, Seal the sensor port opening with silicone sealant to prevent water ingress. Ensure that sensors used on the collector are high temperature rated (up to 250℃/486F), in particular the cable.

3.6. Wind and snow load

When installing the collector please consider the issue of wind resistance and the resultant stress on the attachment points. the standard frame is designed to withstand wind speeds of up to 120km/h and 30cm snow accumulation without damage. For the areas with possibility for high winds, additional reinforcement of attachment points may be required and can easily be supplied by your local installers.

3.7 Heat transfer fluid

In the cold area, we recommend you to use the glycol as the freezing protection. The mixture percentage of the glycol/ water, please comply with the relevant local standards and regulations or consult it with the local professional plumbers.

3.7.1Only use the food grade polypropylene glycol.

3.7.2 Ideally use glycol with additives that provide resistance to breakdown during the high temperature.

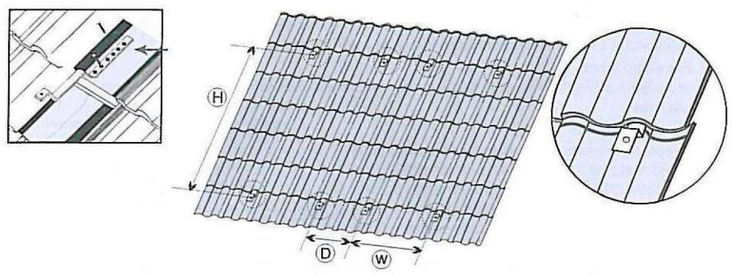
3.7.3 Glycol should be check (PH) and replaced periodically as specified by the glycol manufacturer.

4 Stagnation and Overheating

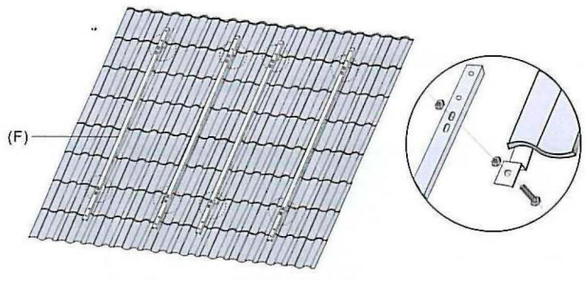
Stagnation refers to the condition that occurs when the pump stops running, due to pump failure, power blackout, or as a result of a high tank temperature protection feature built into the controller, which turns the pump off. If a PTRV is installed on collector inlet or outlet the collector will continue to increase in temperature until the limit of the temperaure relief valve is reached, at which point hot water will be dumped from the system. If a PTRV is not installed on the collector, steam will form in the header. Eventually some steam may feed back to the storage tank via the return line. The PTRV on the tank will open to release pressure or heat as required. Under such conditions the manifold will normally reach a maximum temperature of around 160℃/320F.. Generally the heat returning from the collector in the form of steam is not enough to affect a continued increase in tank temperature (ie. Heat input <tank heat losses)Under normal use stagnation should rarely occur as a result of pump stoppage, since power blackouts normally happen during storms and not clear sunny weather. High tank temperature protection should only occur when hot water is not used for several days (when on holiday), and only during strong periods of sunlight (summer). If leaving the house for an extended period of time (more than 2–3days), it is advisable to cover the collector panel or design the system with a heat dissipation device or alternative use for the heat, thus preventing overheating of the system and collector stagnation. Stagnation of the solar collector will NOT damage the solar collector, however insulation used on the piping close to the manifold inlet and outlet should be able to withstand temperatures of up to 200℃/395F.(Eg. Glass wool or mineral wool–with an exterior wrap of aluminium foil, thus protecting against the elements).

5.Frame Installation

5.1 inclined roof fixing way 1

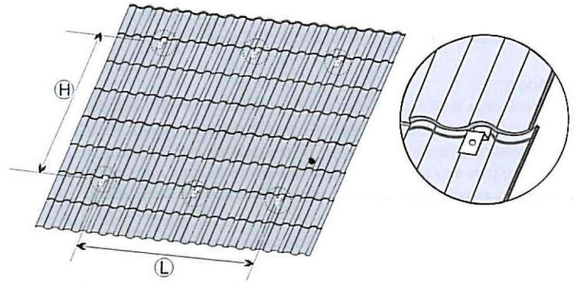


A. to fix the mounting sheets at the roof, (the size Ⓗ, Ⓦ please check the FORM 1,)

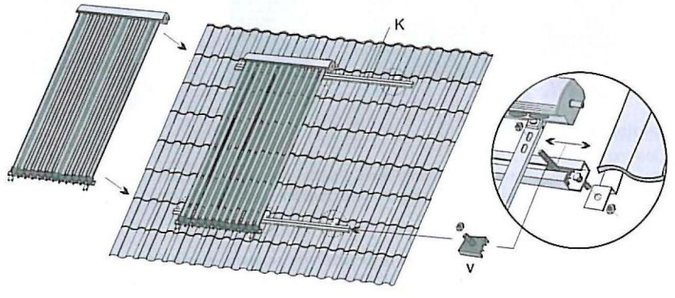


B. To fix the collectors track (F) on the mounting sheets.

5.2 inclined roof fixing way 2



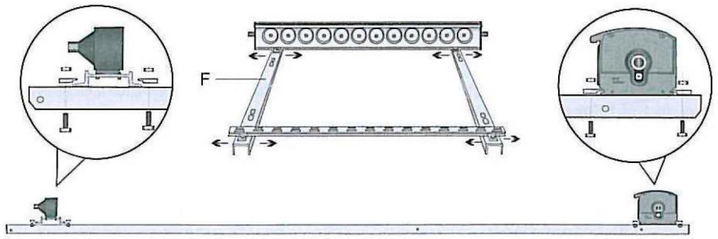
A.to fix the mounting sheets on the roof,(the size Ⓗ please check the FORM 1,) the Ⓛ length not longer than the width of collectors.



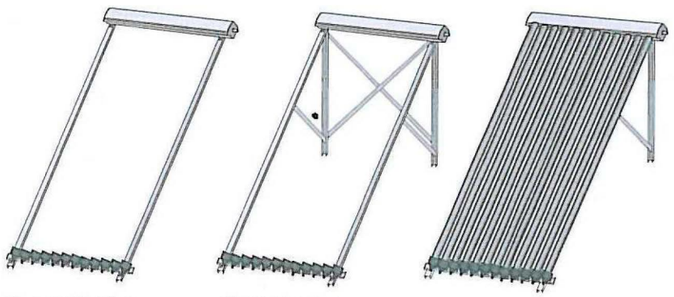
B. To fix the runner tracks (K), optional parts at the mounting sheets, the collectors mounted by the runner screws.

5.3 Flat roof frame fixing

A. to install the manifold and bottom track on the front tracks F, to fix it by the press pads.



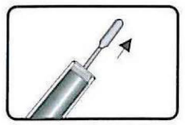
B. the flat roof bracket is the optional purchase parts.



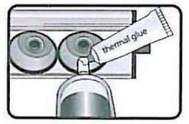
Slope roof bracket

Flat roof bracket

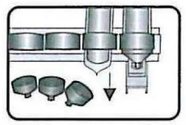
6.Insert the heat pipe vacuum tubes



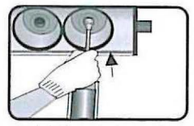
1.pull up the heat pipe header 20-30CM.



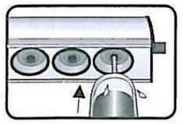
2.Evenly coated with thermal glue on the condenser.



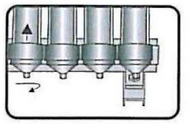
3. Vacuum tube tail into the pipe supports from top to bottom.



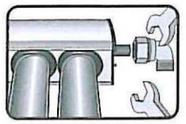
4. holding the heat pipe forced into socket on the manifold.



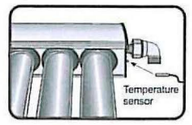
5.lubricate the vacuum tube header,vacuum tube inserted into the manifold.



6.turn the tube holder to be tightly (to keep vacuum tube could not be moved up and down)



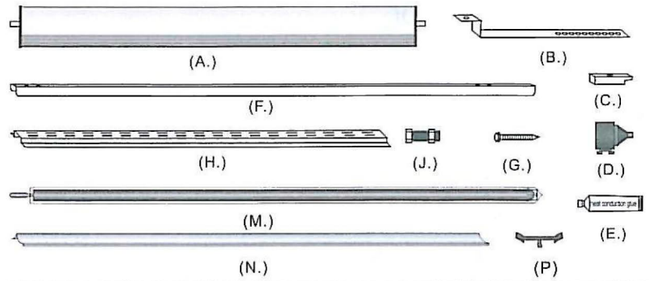
7. To fix the ferrule fitting connections on inlet/outlet.



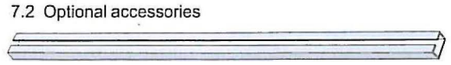
8. insert the Temp.sensor into the socket, ensure it locate at the hot water outlet.

7.Packing List

7.1 standard accessories



7.2 Optional accessories



(K.) runner

(V.) runner screws

22-3/4" 22-1/2" 22-3/4" 22-1/2" 22-22 Flexible pipe 22-22 Insulation cover

No.	Type	quantity	No.	Type	quantity
(A.)	Manifold	1	(H.)	Bottom track	1
(B.)	Mounting sheet	4/6	(J.)	Bolts	
(C.)	Press pad)	4	(M.)	Heat pipe vacuum tube	
(D.)	Tube holder		(N.)	CPC reflector	
(E.)	Heat conduction glue	1	(P)	CPC clip	
(F.)	Front track	2/3			
(G.)	Wood screws	4/6			

8.Installation collector

8.1. Collector Direction

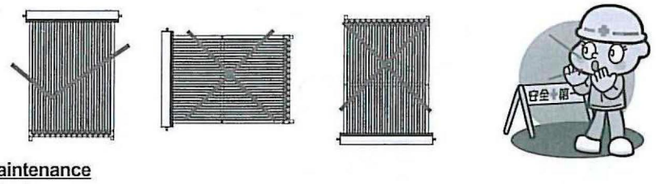
The collector should face the equator, which if in the Northern hemisphere is due South, and vice versa. Facing the collector in the correct direction and at the correct angle is important to ensure optimal heat output from the collector, however a deviation of up to 10° from due North or South is acceptable, and will have minimal effect on heat output.

8.2. Collector Angle

It is common for collectors to be installed at an angle that corresponds to the latitude of the location. Installing at an angle less than 20° is not recommended as the heat pipes perform best in the range of 20-70℃ While adhering to this guideline ,an angle of latitude +/-10° is acceptable, and will not greatly reduce solar output. Angles beyond this range may be used, but a decrease in heat output will result. An angle lower than the latitude will enhance summer output, while a greater angle will enhance winter output.

8.3. Location

The collector should be positioned as close as possible to the storage cylinder to avoid long pipe runs. Storage cylinder positioning should therefore consider the location requirements of the solar collector. The storage cylinder should also be located as close as possible to the most frequent draw off pipe runs.



9. Maintenance

9.1. Cleaning

Regular rain should keep the evacuated tubes clean, but if particularly dirty they may be washed with a soft cloth and warm, soapy water or glass cleaning solution, If the tubes are not easily and safely accessible, high pressure water spray is also effective.

9.2. Leaves

During autumn, leaves may accumulate between or beneath the tubes. Please remove these leaves regularly to ensure optimal performance and to prevent a fire hazard.(The solar collector will not cause the ignition of flammable materials)

9.3. Broken Tube

If a tube is broken it should be replaced as soon as possible to maintain maximum collector performance. The system will still operate normally even with a tube broken. Any broken glass should be cleared away to prevent injury.

10. precautions

10.1. Solar for Central Heating-Preventing Overheating

If a system has been designed to provide contribution to central heating, it will often provide much more heat in the summer than is required for hot water supply alone. In such cases it is advisable for the home to have a spa or pool that can use the heat in the summer period or a heat dissipation device be installed.

10.2. Metallic components

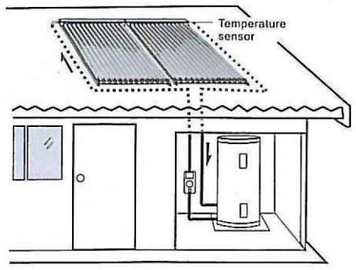
Always wear glove when handing the various solar collector components. All efforts have been made to make the metal components safe to handle, but there may still be some sharp edges.

10.3. Evacuated tubes

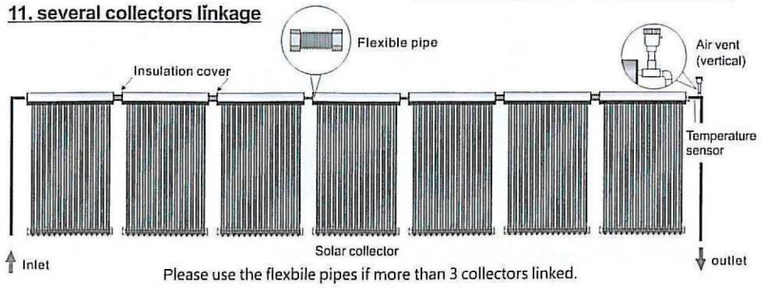
Be careful when handing the evacuated tubes, as they will break if knocked heavily or dropped. Wear gloves if handing any broken glass.

10.4. High temperatures

With the heat pipe installed in the evacuated tube, and good sunlight, the heat pipe condenser can reach temperatures in excess of 200℃/392F. At this temperature touching the heat pipe will result in serious burns, so please take care when experimenting with, or demonstrating the evacuated tube and heat pipes.In an installed, fully plumbed system, if the pump is stopped during good sunlight, the collector header and plumbing pipe close to the manifold can reach temperatures of 160℃/320F, and therefore caution should be taken when touching such components.



11. several collectors linkage



Please use the flexbile pipes if more than 3 collectors linked.

Material	Certificate :EN12975-1,2 SOLAR , KEYMARK
vacuum tube	High borosilicate glass 3.3
coating	SS-CU-AIN/ALN
heat pipe material	TU1 copper
inlet/outlet	22mm
heat pipe diameter	Condenser ¢ 24mm, body ¢ 8mm
manifold header pipe	TP2 copper ¢ 42mm
Max Temperature	240℃
manifold casing	Anodized aluminum alloy
insulation	glass wool/aluminum silicate wool composite
bracket	Aluminum alloy / Galvanized steel
tube holder	UV stabilized nylon
seals	Silicon seal
contact sheets	Aluminum fin

ST141106-10000

ISO9001 ISO1400

zantia