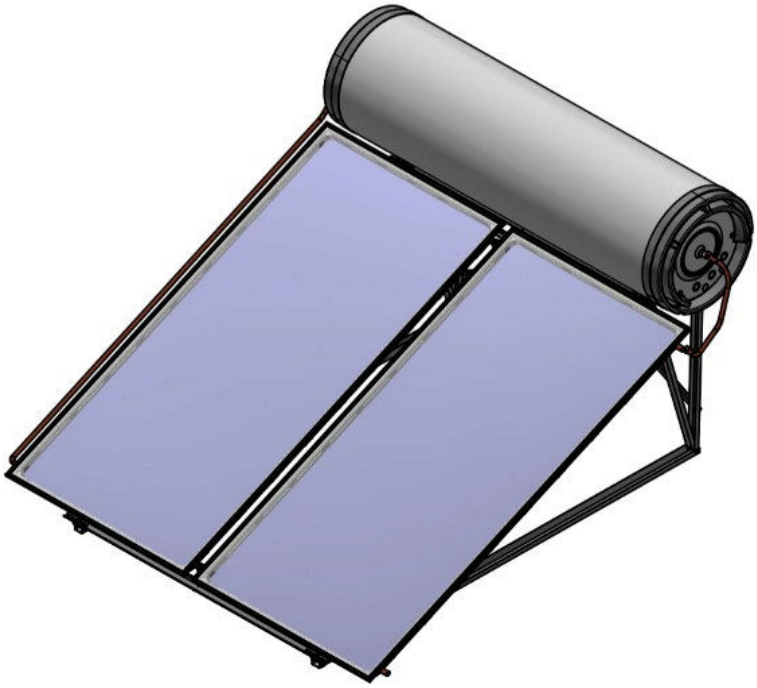
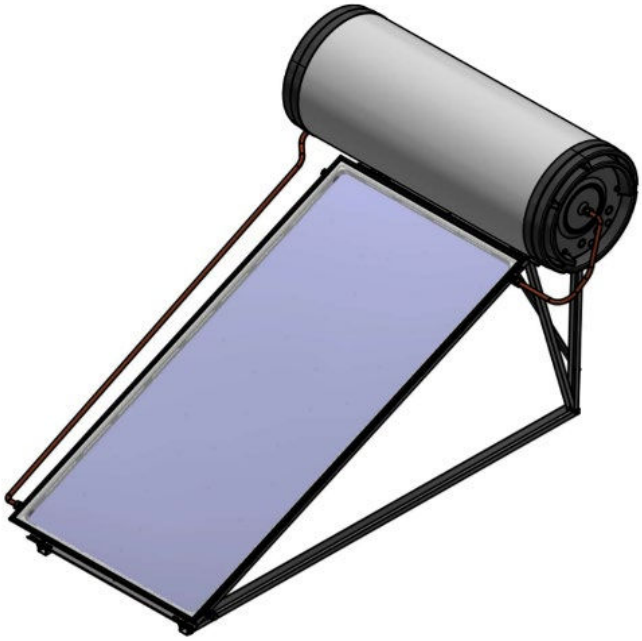
SYRIUS

Comfort by nature





INSTALLATION GUIDE

Solar water heater Thermosiphon INOX

TS-INOX STT Flat Roof - Systems TS-202INOX, TS-304INOX

VERSION 07.22

TS–INOX Thermosiphon Solar Water heater

Welcome

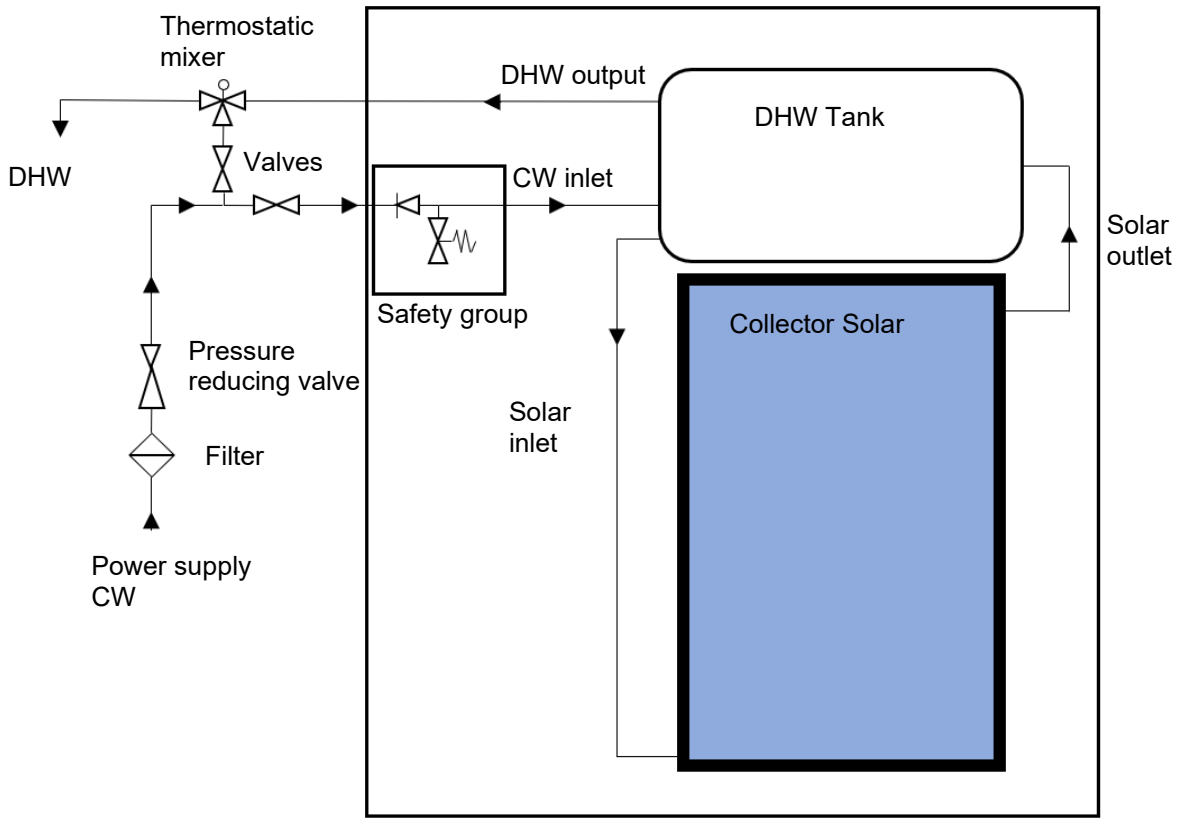
Thank you for choosing our thermosiphon solar water heater from the TS-INOX range. The TS-INOX system is a high quality product. The solar energy is transmitted through by an absorber with a highly selective coating. The robustness of the system is ensured by the tempered safety glass pane, the enameling of the hot water tank and the Magnelis® steel of the supports.

System	**TS-202INOX**	**TS-304INOX**
Type of system	Thermosiphon, direct circulation, without heat exchanger	
Net volume	195 l	279 l
Weight empty	104 kg	150 kg
Weight of full system	299 kg	429 kg
Roof installation	Flat roof	
Collectors	1x **C2000 D12c**	2x **C2000 D12c**
Type	Flat plate collector	
Gross surface area	2.06 m²	4.12 m²
Type of absorber	Absorber made of selective aluminum laser welded on Cu tubes with 8 harp tubes Ø12mm and two manifolds Ø22mm	
Absorber coating	Highly selective coating (absorptance 95%, emittance 5%)	
Dimensions	2033 x 1015 x 98 mm	2033 x 2076 x 98 mm
Net weight	31 kg	62 kg
Liquid content	2.13 l	4.26 l
Cover	Tempered structural glass, 3.2mm, transmission 91%.	
Stagnation temperature	180°C	
Tank	**BHX200**	**BHX300**
Tank type	Stainless steel 316L	Stainless steel 316L
Dimensions	1480 mm, Ø 550 mm	1975 mm, Ø 550 mm
Net weight	44 kg	55 kg
Heat transfer	Direct circuit, without heat exchanger	
Insulation	50mm PU	
Max. pressure	10 bar	
Corrosion protection	INOX 316L	
Cold Water inlet	¾" M	
Hot Water outlet	¾" M	
Hydraulic kit		
Solar circuit fluid	Water	Water
Tube	Copper pipe, Ø 18mm	Copper pipe, Ø 18mm
Pipe mass	1,6 kg	1,8 kg
Max. pressure	10 bar	10 bar
Support		
Material	Magnelis steel	Magnelis steel
Mass	29 kg	33 kg
Permissible load	Max. snow load (pressure) 3 kN/m², Max. wind speed 245 km/h	

Nomenclature

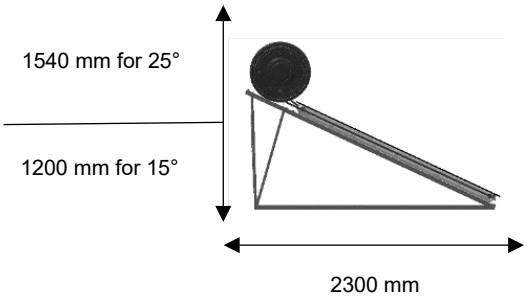
N°.	Description	TS-202INOX	TS-304INOX
1	BHX200 tank, net volume 195 l	1	
2	BHX300 tank, net volume 279 l		1
3	C2000 D12c, collector, harp 2x manifolds Ø22 mm, 8x tubes Ø12 mm	1	2
4	Basic support -STT TS	1	1
4.1	Right spar TS	1	1
4.2	Lefts spar TS	1	1
4.3	Collector crossarm TS 202	2	
4.4	Collector crossarm TS 304		2
4.5	Tank crossarm TS 202	2	
4.6	Tank crossarm TS 304		2
4.7	Right sole TS	1	1
4.8	Left sole TS	1	1
4.9	Rear foot TS	2	2
4.10	Brace TS	2	2
4.11	TS Cross-brace	2	2
5	Basic support, Screws	1	1
5.1	Hexagon head screw M8x16	39	45
5.2	M8 nut	29	29
5.3	Flat washer M8	39	45
5.4	Grower washer M8	29	29
5.5	Anchor bolt M8	4	4
6	Hydraulics	1	1
6.1	Hydraulic tube infeed	1	1
6.2	Hydraulic return pipe (with insulation)	1	1
6.3	Elbowed brass compression fitting 22x18	1	2
6.4	Elbowed compression brass fitting F3/4"x18	2	2
6.5	Straight brass compression fitting 22x18	1	
6.6	Straight brass compression fitting 22x22		2
6.7	Compression brass plug 22	2	2
6.8	Brass free nut 18x3/4".		2
6.9	3/4" HT fibre gasket	2	4
6.10	Safety group	1	1
7	Optional		
7.1	Thermostatic mixer	1	1
7.2	Pressure balancing valve	1	1
7.3	Electric backup	1	1

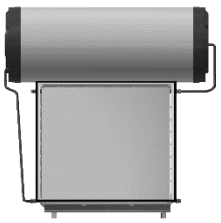
Hydraulic diagram



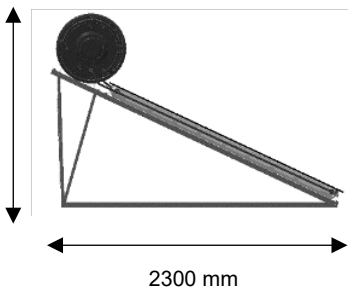
Systems dimensions

TS-202INOX
STT





TS-304INOX
STT



Performance

The performance of TS-INOX water heaters has been determined by the Institute for Building Energetics, Thermotechnology and Energy Storage (IGTE) at the University of Stuttgart in Germany according to EN 12976-2:2006.

The following table summarises the annual performance of TS-INOX, according to location.

Q_d: heat demand in MJ/a, Q_L: solar energy yield in MJ/a, f-sol: solar fraction

TS-202INOX	Qd	QL	f-sol	Qd	QL	f-sol	Qd	QL	f-sol
	MJ/a	MJ/a	%	MJ/a	MJ/a	%	MJ/a	MJ/a	%
litres/day		80			110			140	
Stockholm	4441	2509	56.5	6107	3120	51.1	7772	3590	46.2
Würzburg	4257	2549	59.9	5854	3202	54.7	7450	3717	49.9
Davos	4820	3778	78.4	6628	4646	70.1	8435	5280	62.6
Athens	3305	2977	90.1	4545	3849	84.7	5784	4580	79.2
	Qd	QL	f-sol	Qd	QL	f-sol	Qd	QL	f-sol
	MJ/a	MJ/a	%	MJ/a	MJ/a	%	MJ/a	MJ/a	%
litres/day		170			200			250	
Stockholm	9437	3925	41.6	11103	4130	37.2	13878	4302	31.0
Würzburg	9047	4116	45.5	10643	4374	41.1	13304	4563	34.3
Davos	10243	5695	55.6	12050	5940	49.3	15063	6145	40.8
Athens	7023	5197	74.0	8263	5701	69.0	10328	6289	60.9

TS-304INOX	Qd	QL	f-sol	Qd	QL	f-sol	Qd	QL	f-sol
	MJ/a	MJ/a	%	MJ/a	MJ/a	%	MJ/a	MJ/a	%
litres/day		140			170			200	
Stockholm	7820	4698	60.1	9492	5392	56.8	11163	5960	53.4
Würzburg	7442	4698	63.1	9113	5487	60.2	10627	6054	57.0
Davos	8483	7127	84.0	10280	8104	78.8	12109	8924	73.7
Athens	5834	5424	93.0	7064	6370	90.2	8325	7221	86.7
	Qd	QL	f-sol	Qd	QL	f-sol	Qd	QL	f-sol
	MJ/a	MJ/a	%	MJ/a	MJ/a	%	MJ/a	MJ/a	%
litres/day		250			300			400	
Stockholm	13938	6717	48.2	16745	7158	42.7	22327	7379	33.0
Würzburg	13276	6906	52.0	15925	7474	46.9	21223	7820	36.8
Davos	15137	9870	65.2	18164	10375	57.1	24219	10596	43.6
Athens	10406	8420	80.9	12488	9334	74.7	16651	10596	63.6

General

The following instructions enable authorised personnel to install the systems efficiently and safely. The installation and safety instructions must be followed. The accident prevention regulations of the professional associations must be observed, especially when working on the roof. If there is a risk of falling, precautions must be taken. The entire solar energy system must be installed and operated in accordance with recognised technical regulations. Errors and omissions excepted.

General specifications

These installation instructions describe the installation of the TS-INOX solar water heater for a flating roof.
The main components of the system are as follows:

- Solar storage tank
- Solar collector(s)
- Mounting bracket
- Hydraulic kit

Detailed information can be found in the product nomenclature.
TS-INOX thermosiphon water heaters operate in direct circulation. The storage tank is protected against corrosion (Inox 316L).
The hot water temperature in the storage tank can reach more than 100°C. The maximum operating pressure is 7 bar. If the mains pressure is higher than 4 bar, it is necessary to use a pressure reducer.
For optimum performance, the solar collectors must face south in the northern hemisphere and north in the southern hemisphere. To ensure the production of hot water all year round, it is possible to install an electric back-up. To avoid burns and for greater comfort, it is necessary to install a solar thermostatic mixer.

How does a thermosiphon work?

The water, circulating inside the collectors heats up, expands and becomes lighter than cold water. It rises naturally in the storage tank located above the collectors for the thermosiphon technology. This hot water then replaces the cold water which goes back down to the collectors to be reheated, and so on.
It is a phenomenon of natural circulation of a liquid that uses the variation of its density with temperature.

Packaging, handling and storage

The collector is packaged in two cardboard covered, reinforced by honeycombed wedges on the corners. The tank is wrapped in a protective foam, filmed with stretch plastic film. The supports are wrapped with stretch film, as well as the tubes of the hydraulic kit. The products must be stored indoors. Do not handle the collectors or the tank by the inlet/ outlet tubes. Protect the glass and the back of the collector during transport.

Maintenance

In order to ensure that the system functions properly over time, it is important to carry out all the maintenance steps mentioned in the user manual. If these steps are not carried out, the longevity of the product and its warranty may be affected.

Roof

Before installation, make sure

- that the roof can withstand the load of a TS-INOX water heater once filled.
- that the inclination is sufficient for the thermosiphon's function (see page 6)

Local climatic conditions, such as snow and wind, must be taken into consideration. Please contact your seller for more information.

Location

Make sure that there is enough space available for the correct installation of the system. Please observe the distance to the roof edge of 1.5m. This is necessary with regard to roof statics, snow and wind loads, as well as to facilitate maintenance of the system. If the roof does not allow this, please consult a structural engineer.

Roof waterproofing

In order to avoid moisture and water infiltration problems on the roof, pipes that penetrate the roof must be well sealed. The fixing of the supports is carried out by means of anchor bolts with sealing gasket.

Additional comments

The connecting pipes must be very well insulated to avoid heat loss and UV damage.
We recommend that you declare the TS-INOX water heater to your insurance company as an added value to the building and take out insurance against lightning and glass breakage.

Be careful: On very sunny days, the collectors can become very hot. There is a risk of burning. Therefore, the collectors must be covered during installation. Prefer an installation in the early morning.

Installation guide

The installation of the water heater is described in detail on the following pages. These installation instructions are divided into three parts:

1. Installation of collectors and storage tank
2. Hydraulics
3. Maintenance

Before starting the installation, please consider the following points:

The thermosiphon solar water heater must be installed with a minimum inclination of 15°, corresponding to the limit of use.

Antifreeze corrosion protection

The TS-INOX thermosiphon water heater must not be installed in areas at risk of frost.

Safety group

The safety groups protect the water heaters when the internal pressure reaches 7 bar. This also allows the opening and closing of the water supply to the water heater and the emptying of the water heater by operating the valve cap. The safety group must be connected to the gutter by means of a drain pipe. The drain pipe must be free of obstructions so that the excess water can drain off normally.

Electric connection

Where a booster resistor is required, a circuit breaker must be installed. This installation must be carried out by a certified electrician.

Lightning protection

The load-bearing structure of the collectors must be earthed. If a lightning protection device is already provided for the building, the metal piping of the solar system must be connected to this device with a green/yellow conductor cable with a minimum cross-section of 6 mm² Cu (H07 V-U or R). If this is not the case, an earth spike can also be used for earthing.

Decommissioning and dismantling

The system must be dismantled early in the morning to avoid the risk of burning. Be aware of the system temperatures before starting dismantling. Cover the collectors the day before if possible, to prevent the passage of solar radiation.

Pictograms


Important instructions


Possible danger or damage to the product

Necessary tools


Drilling / screwing machine

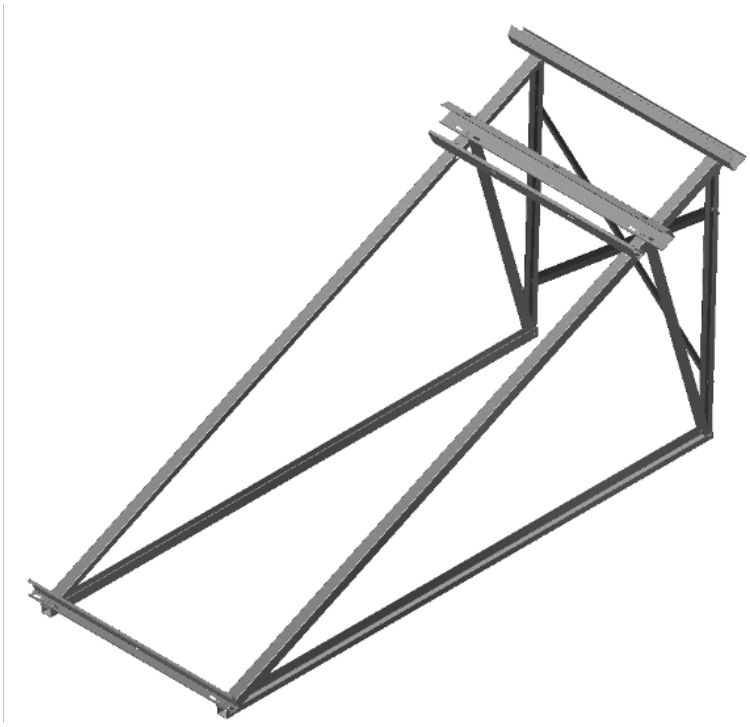

Flat spanner


Multi-handling pliers

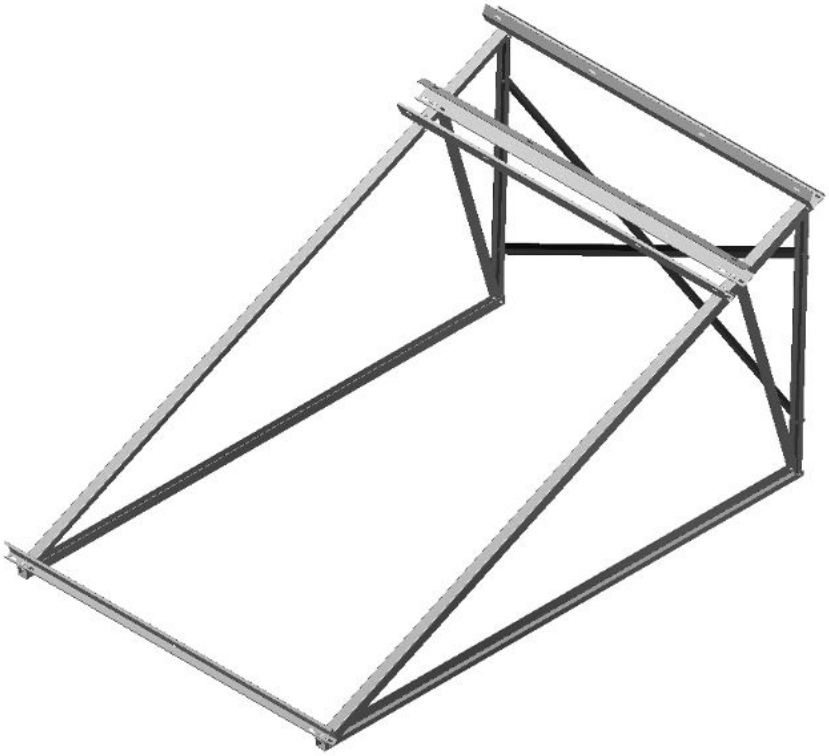

Flat and Phillips screwdriver


Meter

View of flat roof support (STT) (4) for TS-202INOX

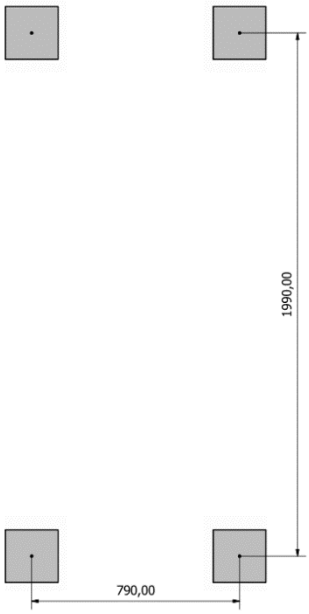


View of flat roof support (STT) (4) for TS-304INOX

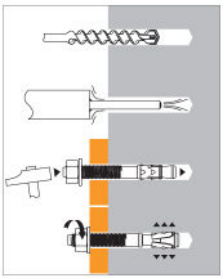


Positioning the cement blocks:

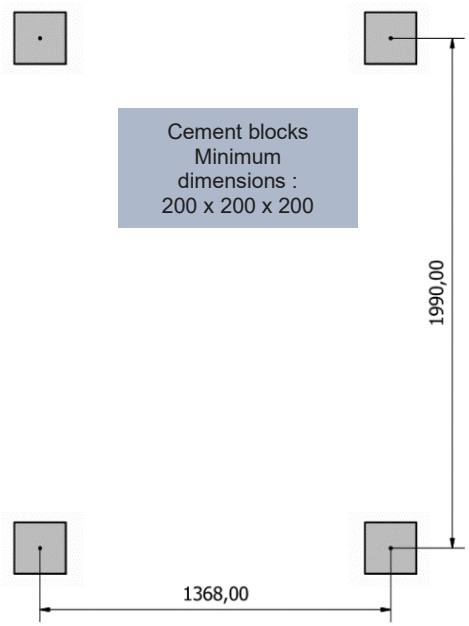
STT TS INOX 202



LAYING METHOD

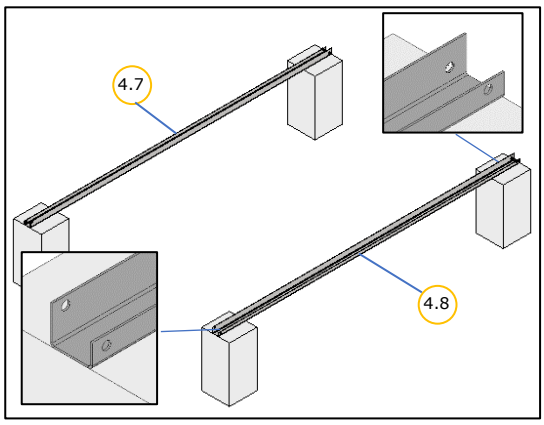


STT TS INOX 304

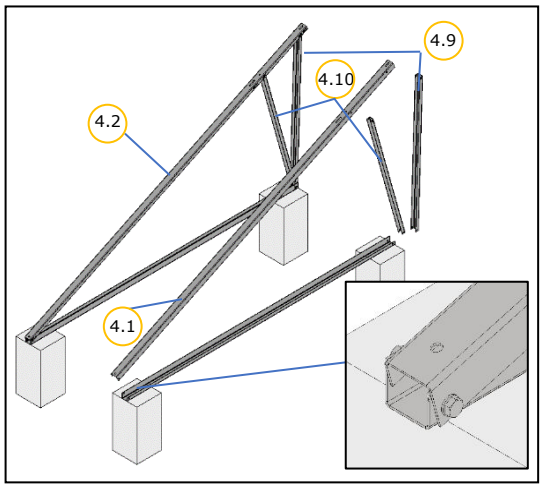


Cement blocks
Minimum
dimensions :
200 x 200 x 200

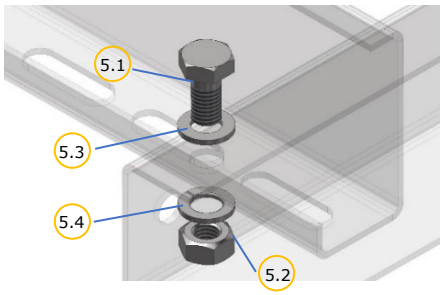
Observe the dimensions given above for the positioning of the cement blocks.
Drill the blocks with an 8mm drill bit.

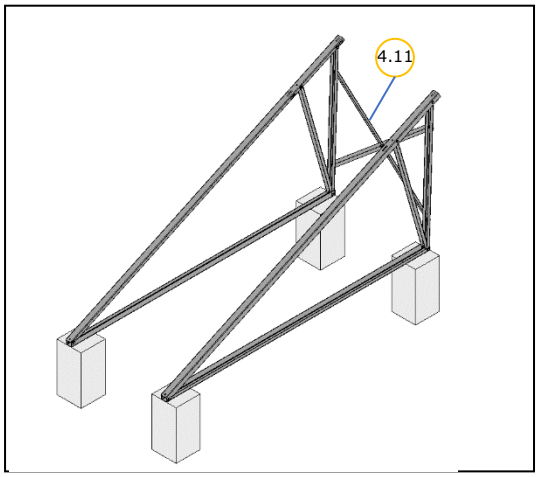


Tighten the soles (4.7) and (4.8) with the M8 anchor bolts (5.5).

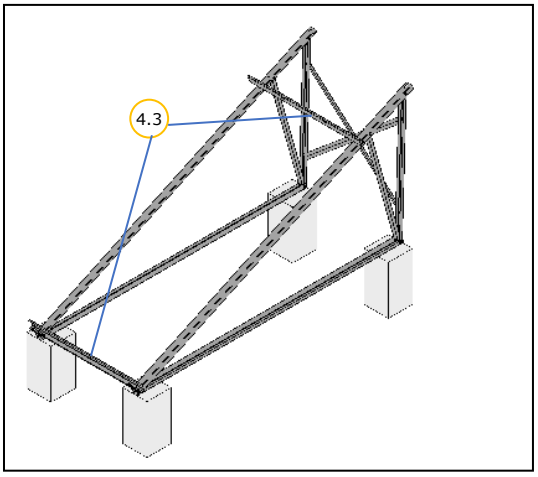


Assemble the spars (4.1) and (4.2), the rear feet (4.9) and the braces (4.10) to the corresponding soles (4.7) and (4.8). Use the screws (5.1) (5.2) (5.3) (5.4) to make the assembly.

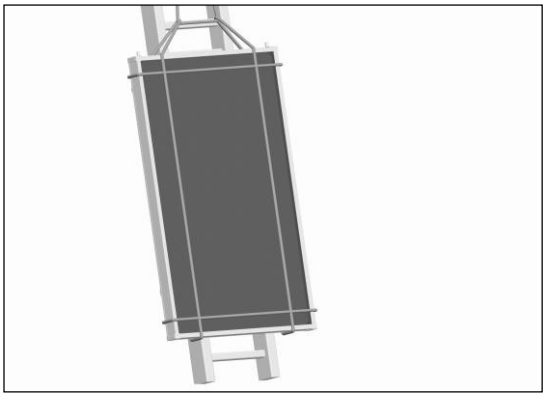




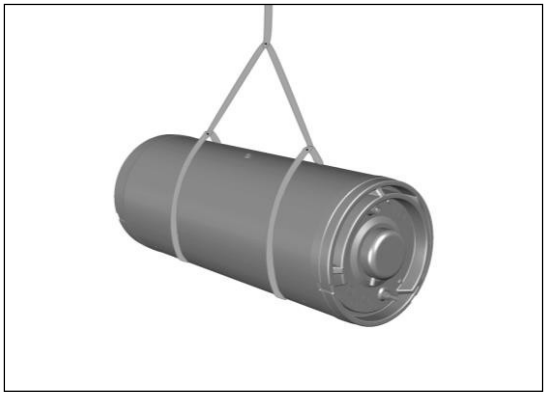
Put together the cross braces (4.11) to the rear feet (4.9).
Use the screws (5.1) (5.2) (5.3) (5.4) to assemble them.



Put together the collector crossarm (4.3 or 4.4) to the spares (4.1) and (4.2).
Use the screws (5.1) (5.2) (5.3) (5.4) to assemble them.



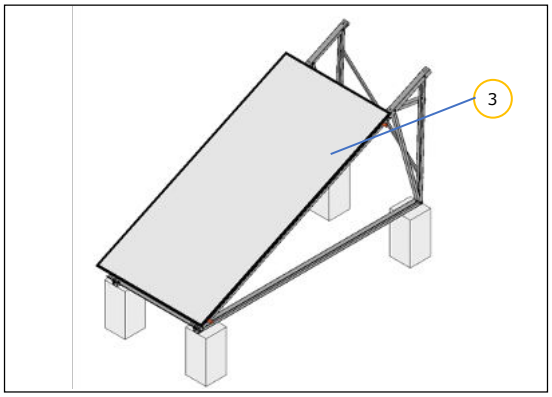
Lift the collectors (3) on the roof. For lifting, attach two sturdy ropes as shown opposite. During handling, check that the rope doesn't cover the copper inlet/ outlet tubes. It is recommended to use a crane for lifting. If necessary, carefully use, a ladder to mount the collectors on the roof. Work in pairs: one installer secures the collectors, the other guides them.



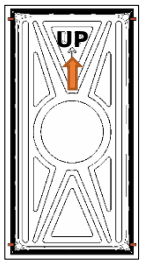
Raise the tank on the roof. For assembly, attach two sturdy ropes as shown opposite. We recommend using a crane for lifting. Work in pairs: one installer secures the tank, the second one guides the thank.

Observe the safety instructions! Don't walk under suspended loads.
Secure the collectors and the tank to prevent falls.

202INOX

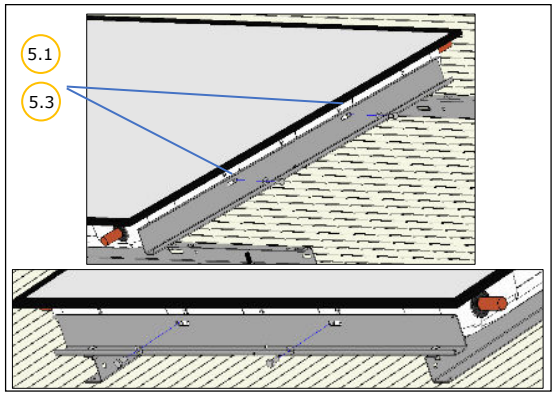


Place the collector (3) on the mounting system.

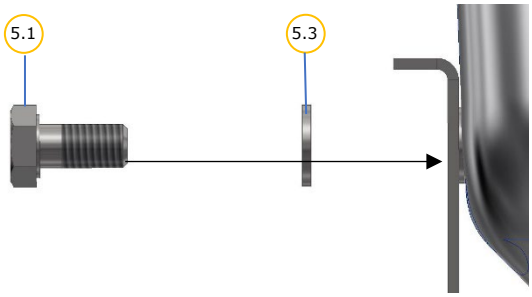


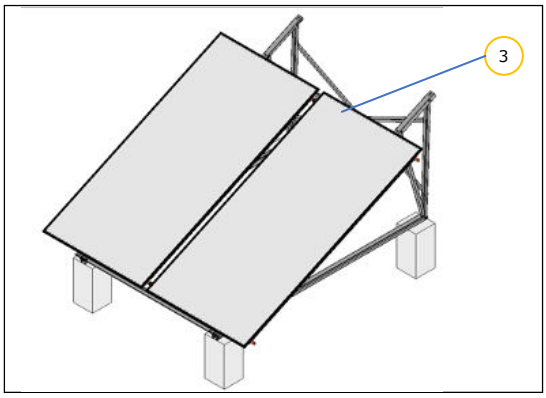
Rear view of the collector

202INOX



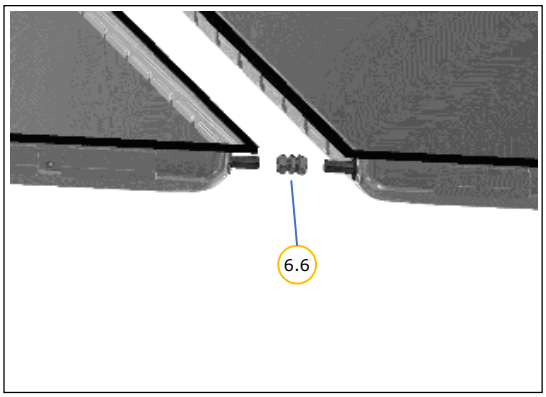
Screw the collector on the collector crossarm (4.3) with M8 screws (5.1) and flat washers (5.3).





304INOX

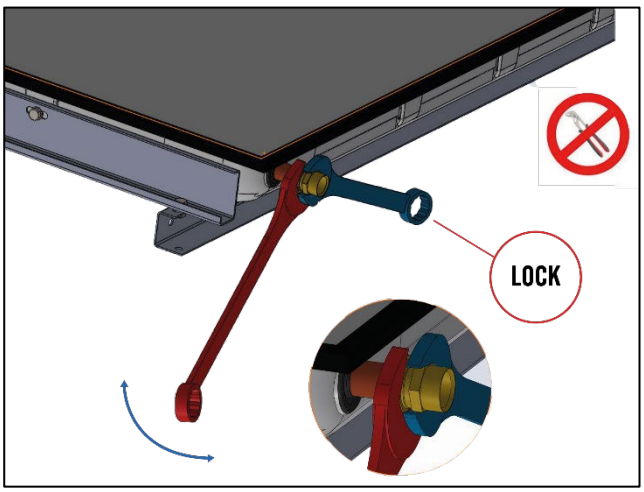
Place the collectors (3) on the mounting system.

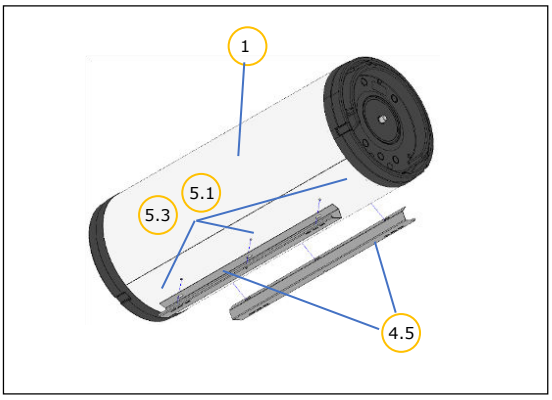


304INOX

Connect the collectors with 22x22 fittings (6.6)

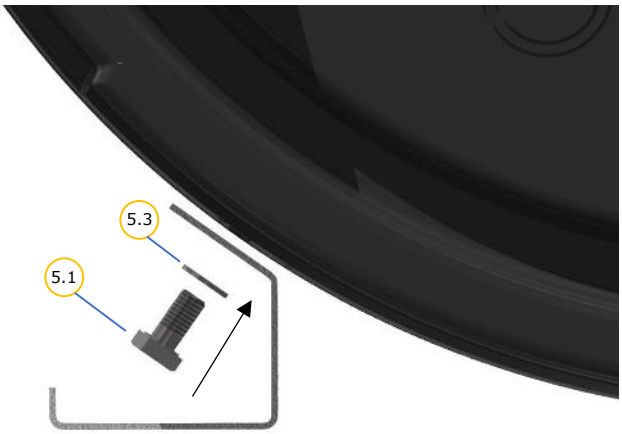
Be careful not to overtighten the connections. The collectors tappings are fragile.
It is necessary to use 2 flat spanners, one to hold the central nut to prevent rotation of the fitting, and another to tighten the nut on each side. Failure to follow this protocol will result in damage to the welds and the collector.



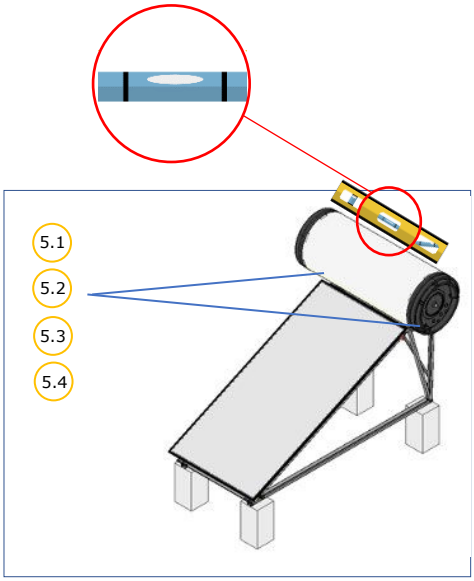


Remove the protective film from the bottom sheet of the tank and fix the storage tank crossarms (4.5 or 4.6) to the storage tank with the M8 screws (5.1) and flat washers (5.3).

The cold water inlet and hot water outlet must be on the left side of the tank when standing in front of the water heater.



The tank must be positioned horizontally

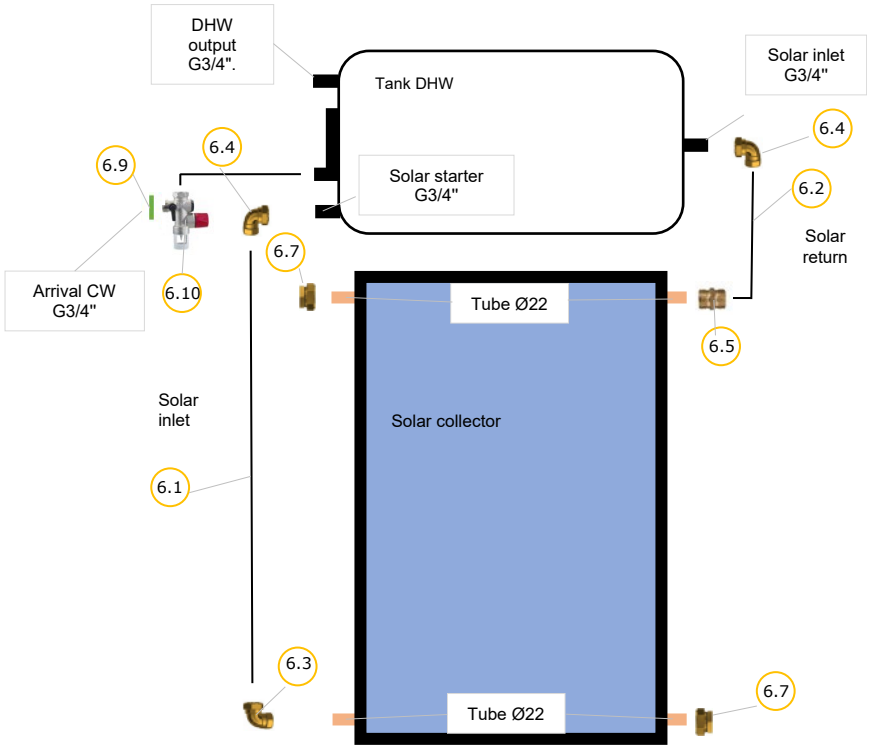


Place the tank (1) on the spares (4.1).
Screw the tank crossarms (4.5 or 4.6) to the spares with the screws (5.1) (5.2) (5.3) (5.4).

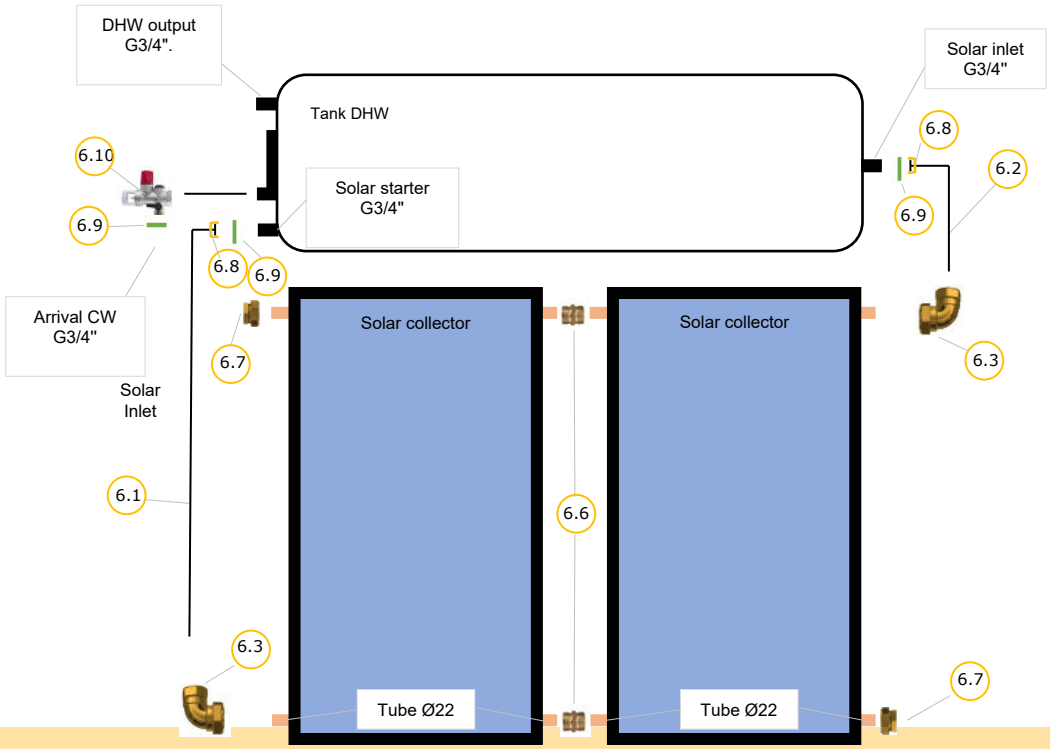
Tighten all screw assemblies.

Overview of the hydraulic connections of the **TS-INOX 202:**

(Refer to the page 3)



Overview of the hydraulic connections of the **TS-INOX 304:**



Model 200L

Connect the hydraulic kits according to the following considerations:

Connect the flow pipe (6.1) between the storage tank and collector using the compression fittings (6.3) and (6.7). The connection (6.7) at the tank connection must be sealed with sealing compound and thread (NO TEFLON).

Do the same with the coupling (6.4), then connect the return hose (6.2) using the compression fittings (6.4) and (6.5).

Place the compression caps on the 2 remaining collector inlet/ outlet tubes.

Assemble the safety group (6.10) to the flask using a high-temperature fibre gasket or joint compound and thread.

Model 300L

Connect the hydraulic kits according to the following considerations :

Connect the flow pipe (6.1) between the storage tank and collector using the compression fittings (6.3) and the loose nut (6.8) with the high-temperature fibre seal (6.9).

Likewise, connect the return pipe (6.2) using the compression fitting (6.3) and the loose nut (6.8) with the high-temperature fibre seal (6.9).

Place the compression caps on the 2 remaining collector inlet/ outlet tubes.

Assemble the safety group (6.10) to the flask using a high-temperature fibre gasket or joint compound and thread.

Remove the remaining protective film from the storage tank before commissioning.

Filling the water heater :

- Turn on a hot water tap in the dwelling.
- Open the water supply, at the safety group level
- Allow the air in the water heater to bleed through the hot water tap open for this purpose.
- When water flows out of the hot water tap, turn it off. This means that the water heater is full.

Be sure to use a thread to allow the system to be watertight.
Each screwed connection must be sealed with a wire rope.

Do not use Teflon

Installation Checklist

System	
Installation date	
Customer's name	
Customer's address	
Tank serial number	
Collector serial number	
Installer name	

INSTALLATION Checklist

Was the installation carried out in accordance with the rules on health and safety at work? ☐

Has the system been installed according to this installation manual? ☐

Is the minimum distance from the edges of the roof 1.5 m? ☐

Have the pipe connections through the roof been properly sealed? ☐

Are all screws and mechanical connections properly tightened and double checked? ☐

Have the safety group, the pressure reducer and the thermostatic mixer been installed and their use checked? ☐

Are all hydraulic connections securely tightened and has the system been checked for leaks? ☐

Has the cover on the collector been removed after installation? ☐

Has the protective film on the storage tank removed before commissioning? ☐

Does the system produce domestic hot water during sunny periods? ☐

Has the customer been informed about the use of this system and have they been given to this manual? ☐

Maintenance Checklist

System	
Maintenance date	
Customer's name	
Customer's address	
Tank serial number	
Collector serial number	
Installer name	

MAINTENANCE Checklist

Is the support in good condition? Are all the screws tight? ☐

Is the tank in good condition and free of leaks or other damage? ☐

Is the collector in good condition and free of leaks or other damage? ☐

Is the pipe insulation in good condition? ☐

Has the functionality of the valves and safety components been checked? ☐

Are all hydraulic connections securely tightened and has the system been checked for leaks? ☐

Does the system produce domestic hot water during sunny periods? ☐

TECHNICAL DATASHEETS (products, accessories...) available on www.syrius-solar.com

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