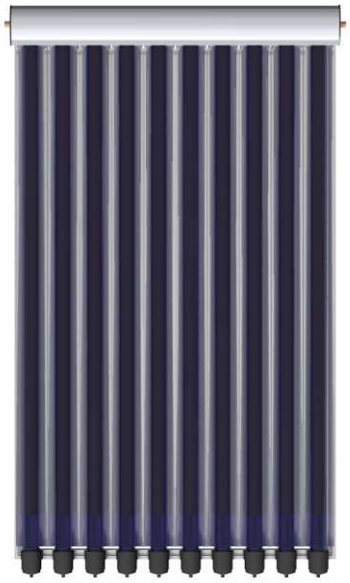
INSTALLATION MANUAL
Solar collectors DTH-CPC

- Edition 2011 -



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Summary

0. INTRODUCTION

0.1 GENERAL CONSIDERATIONS

This technical manual is a reference for installing Thermics DTH-CPC solar systems. We advise you to read the whole of this manual before proceeding with any other collector installation operation and to pay a lot of attention to the highlighted parts and to Chapter 3 on safety.

Installation of DTH solar collectors must be carried out by qualified personnel only. The guarantee period is considered expired if the instructions for installation and first switch on of the system suggested by Thermics Srl are not followed. The Guarantee is forfeited if components and configurations not indicated by Thermics Srl are used. In the event that, for technical reasons, it is not possible to follow the instructions given below during installation, contact and inform Thermics staff of any envisaged modifications before proceeding.

0.2 GENERAL SAFETY NOTE

We recommend having the solar collectors installed by qualified personnel only; some stages of installation can be dangerous and cause injury to persons and damage to property if not carried out correctly. Work on plumbing, wiring and gas installations must be carried out with the greatest care and in accordance with current safety regulations. Before carrying out any work, make sure you have hydraulically and electrically isolated the part of the system you are about to work on.

In this manual, the symbols  and  will be used to point out actions that can cause injury to persons and the symbol **!** or explanatory notes will be used for further useful information for correct operation of the system.

For a more thorough treatment of personnel safety during installation of the collector, read Chapter 3 carefully.

0.3 OPERATING PRINCIPLE

Thermics Direct-Flow DTH-CPC collectors have a forced circulation solar circuit. The borosilicate glass vacuum tubes consist of two coaxial glass tubes one inside the other. During manufacture, a vacuum was created in the space that separates them. This vacuum lasts forever unless the element is broken completely. The inner tube is coated with a highly selective layer of chromium nitrate and aluminium nitrate. Solar energy passes through the first tube that is completely transparent to radiation and is absorbed on the selective surface of the inner tube. The heat collected on the surface is immediately transmitted to the central copper core (Direct-Flow) by aluminium fins. The Direct-Flow contains two concentric channels inside which the heat-carrying fluid circulates in two opposite directions; the cold fluid coming from the rest of the system circulates in the innermost channel and the hot fluid ready to be sent to the solar boiler (fig. 0.5-1) circulates in the outermost channel. Each vacuum tube therefore has two separate hydraulic connections that are inserted in two independent parallel collectors, in common with the other tubes. A mixture of water and propylene glycol circulates in this system of pipes.

Note: Collectors equipped with Direct-Flow do not have installation limitations as regards inclination; the circulation of the solar fluid is guaranteed at all times by the circulation pump situated on the delivery side of the system; extreme installations on a vertical wall or flat roof without sloping trestle are therefore possible.

Fig. 0.5-1

Note: The breakage of a glass tube with consequent loss of vacuum causes a reduction in the overall efficiency of the collector but does not impair the operation of the entire solar system.
Any problems that involve replacement of the vacuum tube and relevant Direct-Flow require the temporary stopping of the entire solar system.

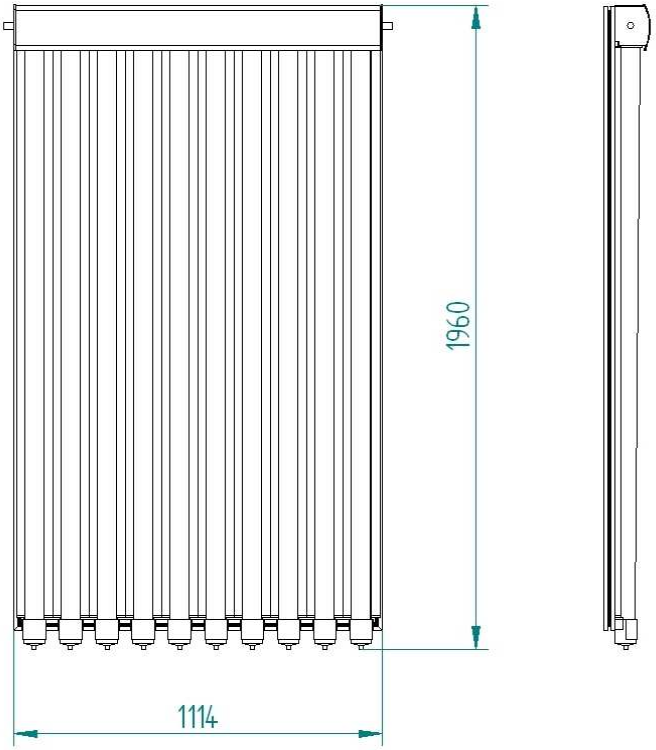
1. TECHNICAL DATASHEET

1.1 GLASS VACUUM TUBES CHARACTERISTICS

Model	DTH-CPC
Weight	2,5 kg
Material	vetro borosilicato 3.3
Diameter of outer tube	58 mm
Diameter of inner tube	47 mm
Thickness of outer tube	2.2 mm
Thickness of inner tube	1.6 mm
Length of tube	1800 mm
Selective material	Graded Cr-Al-N/Cu
Absorbance	≥ 94% (AM1.5)
Emissivity	≤ 6,5% (80°C)
Vacuum degree	$P < 3 \times 10^{-3}$ Pa
Trasmittance of outer tube	≥ 90%
Stagnation temperature	260 °C
Loss factor	< 0.8 W/(m²K)
Hail resistance	40 mm
Pressure resistance	No

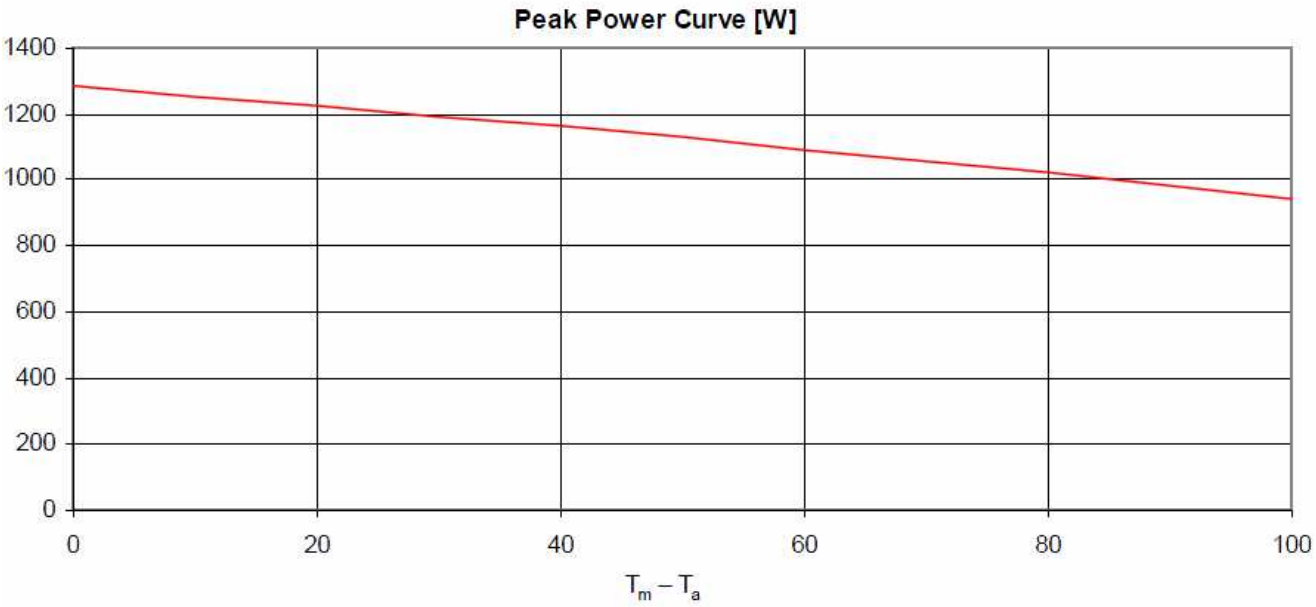
1.2 DTH COLLECTORS CHARACTERISTICS

Model	10 DTH-CPC
Number of tubes	10
Gross dimensions (H×W×T)	1965×1132×140 mm
Gross collector area	2.22 m^2
Aperture area	1.96 m^2
Weight	49 kg
Fluid capacity in the collector	2.35 l
Hydraulic connections	ϕ 22 a stringere
Nominal flow rate	120 l/h
Stagnation temperature	182 °C
Maximum working pressure	10 bar
Thermal insulation	
Collector insulation	Paroc (30 mm)
Insulation properties	Mineral wool with aluminium protection foil
Density	100 Kg/mc
Thermal conductivity at 100°C	0,042 W/mK
Manifold	
Manifold material	Alluminium
Surface treatment	Anodized + (opt. Powder coating)
Manifold thickness	1.2 mm
Parabolic CPC mirror	
Material	Alanod aluminium
Thickness	0.5 mm
Reflection ratio	86%

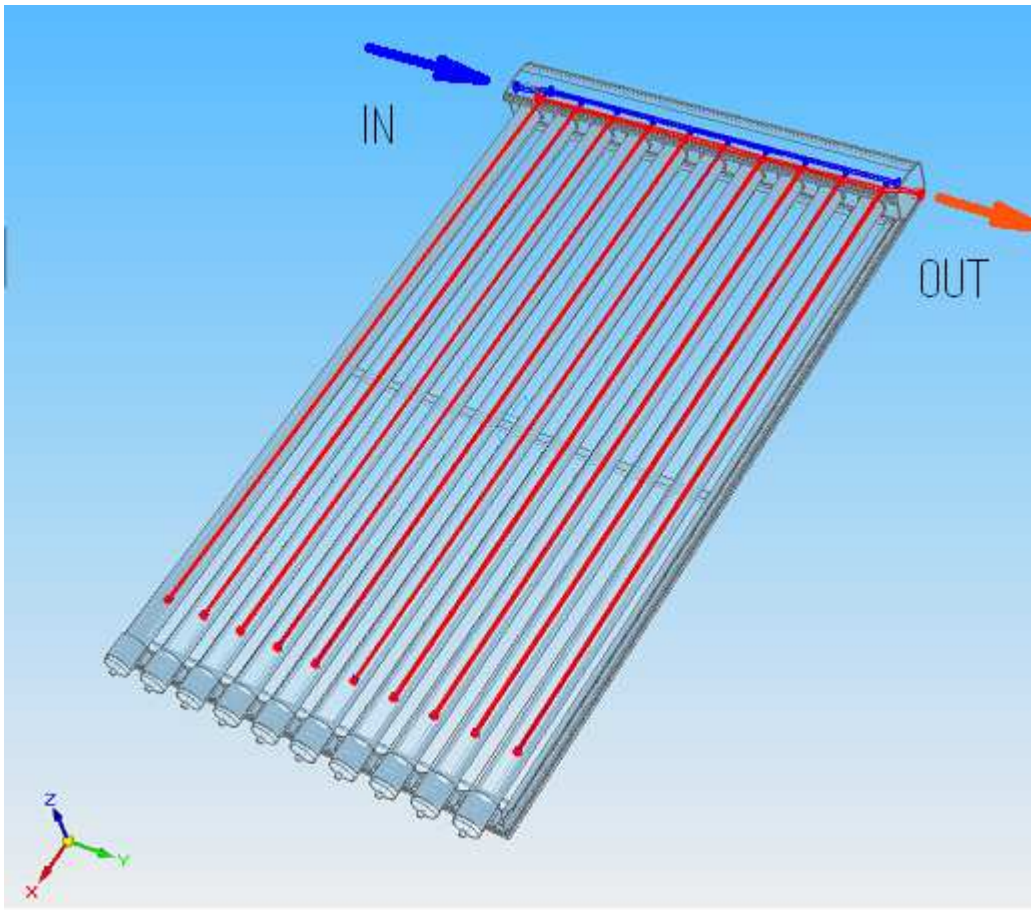


1.3 DTH-CPC Performances

Peak power output (Watt)



1.4 HYDRAULIC CONNECTIONS AND TEMPERATURE SENSOR INSTALLATION



Dimension the lines of the solar system with diameter suitable for the envisaged fluid flow rate in order not to have excessive load losses along the way. For physical stability at high temperatures, we advise the use of flexible stainless steel pipes, copper pipes, or equivalent or in any case with equal or better characteristics.

To make the connecting solar system between the DTH solar collector and the storage boiler, use pipes with insulation that has high thermal resistance and is not less than 20 mm thick.
We advise the use of pipes that have been pre-insulated with insulating sheath (thermal conductivity less than 0.04 W/mK) and protected with a special film that is resistant to rain, ice and UV rays.

Note. Thermics can supply flexible, continuous-spiral stainless steel pipes that allow fast installation and make it easy to evacuate the air from the solar circuit during the system filling operation. The graphite gaskets present in the fittings guarantee a perfect seal even at high temperatures (450 °C). These pipes are pre-insulated, pre-wired with electrical cable for thermal probe and can also be used for sanitary circuits, as they have obtained the relevant sanitary certification.

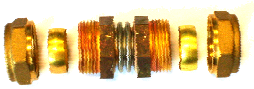
1.4.1 SERIES AND PARALLEL CONNECTIONS

DTH solar collectors are not particularly suitable for series connection because they are characterized by medium load losses; we therefore advise you not to connect more than 5 collectors in series. Should it be necessary, for average sized systems, use a parallel connection and carefully assess the fluid flow rates and the temperature drops between inlet and outlet.

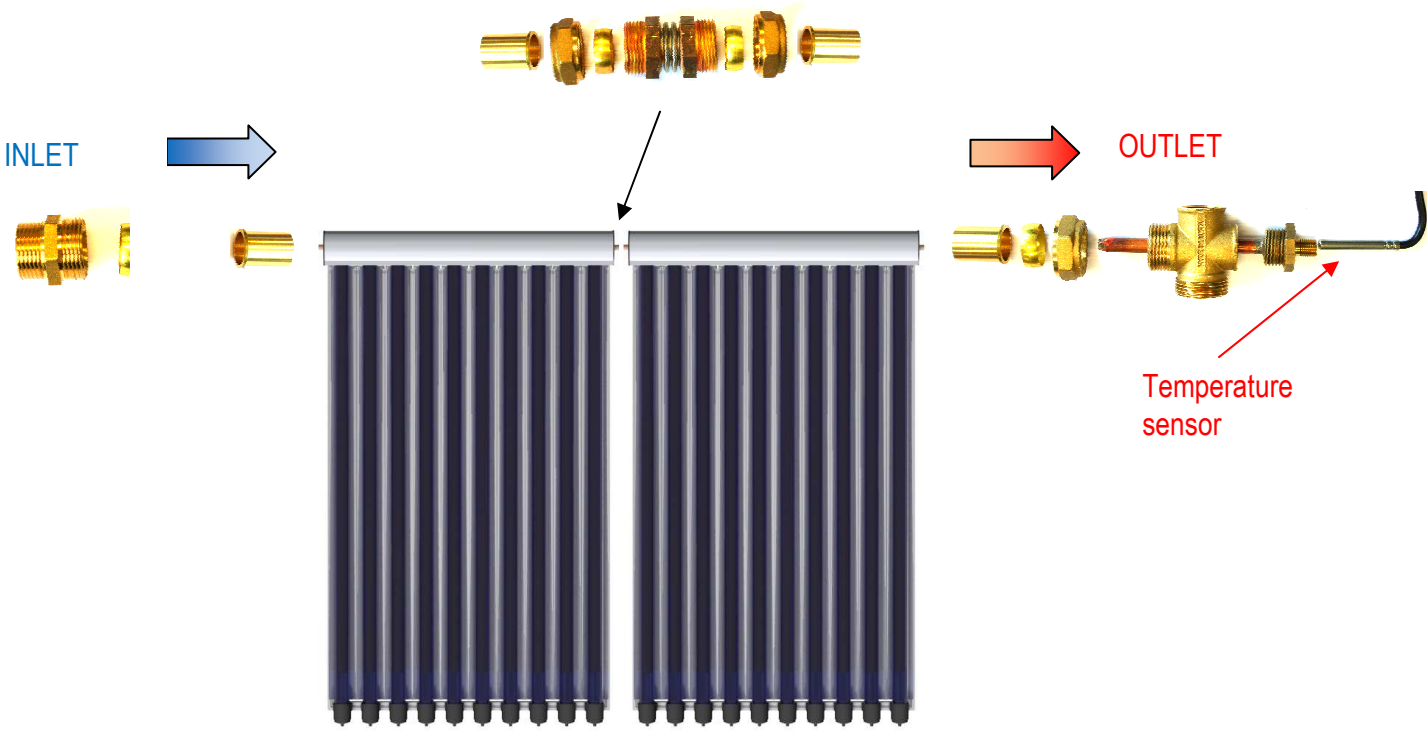
To assess the pressure losses in the collectors as the fluid flow rate changes, consult the graphs shown below in section 1.4.2.

! Take the utmost care when designing the system in order to guarantee that all the units connected in parallel develop the same water flow rate. You should therefore avoid configurations in which there may be preferential routes for the fluid; if this happens, balance the various branches of the circuit with suitable lengths of pipe or with appropriate hydraulic components. If the circuit is unbalanced in operating conditions, the performance of the entire system could be impaired.

! To connect the solar modules to the system, use Thermics flexible connectors

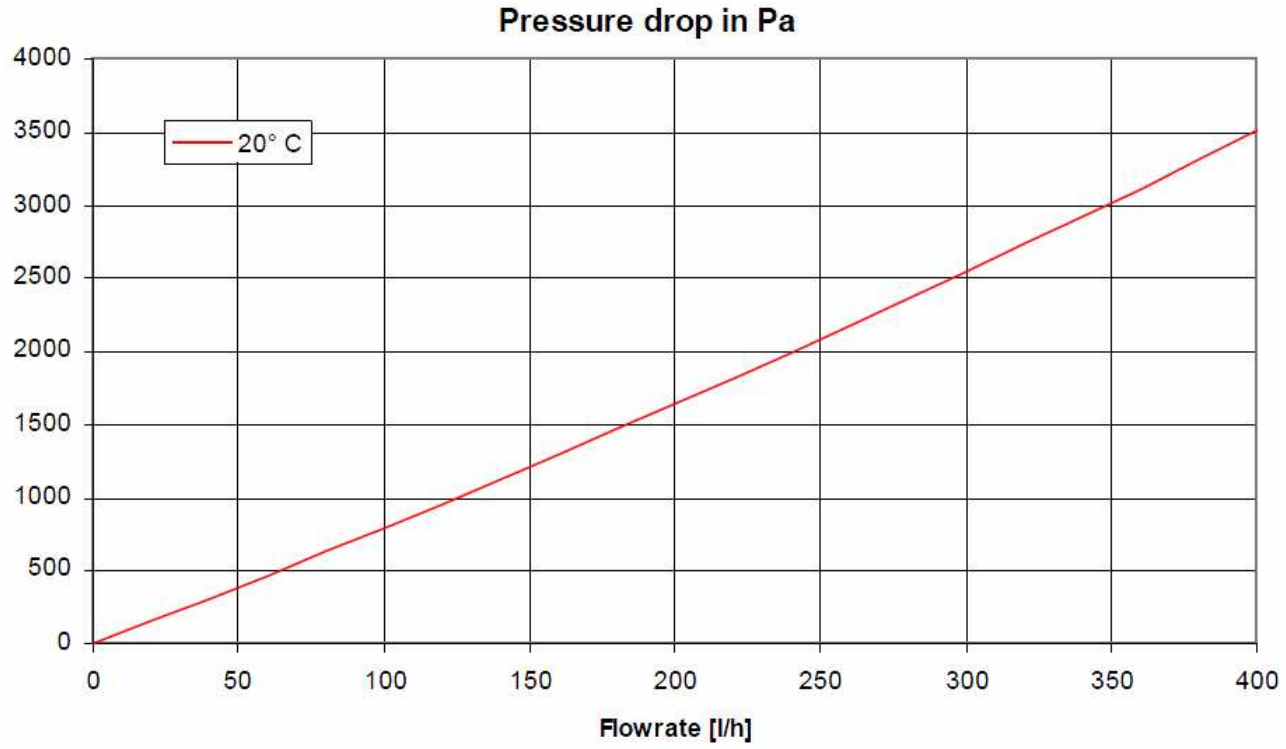


Use suitable sealing systems to protect against fluid leaks and entrance of air into the system; avoid using Teflon tape because the high temperatures present can impair its seal. It is therefore advisable to use screw-on hose fittings with flat synthetic fibre gaskets that are resistant to high temperatures.



1.4.2 DTH-CPC PRESSARE DROPS

The load losses of DTH collectors are shown below and are essential for good system dimensioning.



1.4.3 ANTIFREEZE PROTECTION OF THE COLLECTOR AND THE SYSTEM

DTH-CPC collectors are thermally insulated thanks to:

- Glass wool insulation shaped around the collector (inside the painted aluminium casing).
- Insulation given by the vacuum between the glass tubes.

Despite the innate insulation of the system, it is necessary to add glycol to the water circulating in the solar circuit for protection against freezing and overheating that could damage the system.
Thermics recommends the use of ready-to-use mixture ZITREC L-10; this fluid, stored in 25-litre cans, contains suitable quantities of demineralised water, glycol and anticorrosive agents for the protection of system pipes. Antifreeze protection is guaranteed down to a temperature of -10 °C.

! The safety data sheet for ZITREC L-10 fluid can be read in section 3.4.

Note. The guarantee does not cover the collectors in the event of improper use of, or use in inappropriate amounts of, antifreeze additives that are not recognized as suitable for the optimal operation of the product.

1.5 RESISTANCE TO WIND AND SNOW

The DTH-CPC collectors have been designed and constructed to withstand winds of up to 1000 Pa pressure and to support snow loads. Since wind and snow are atmospheric events that vary from area to area, we advise you to consult the relevant technical material for possible local restrictions.

! As particular local regulations may be in force, before proceeding with any installation work, you are required to check whether any restrictions are set by them.

! You are also required to verify that it is possible to properly anchor the collectors, so as to prevent any possibility of them falling off.

! Thermics Srl cannot be held liable in any way for injury to persons or damage to property arising as a result of failure to comply with the regulations in force in the place of installation or for installations that are not suitable for maintaining the best conditions of safety during the life of the collector.

	Make sure the collector has been firmly anchored and that there is no possibility of it becoming detached and falling!

2. MOUNTING STEP AND SPECIFICATIONS

2.1 PACKAGING

DTH-CPC collectors come in separate boxes together with the following optional accessories:

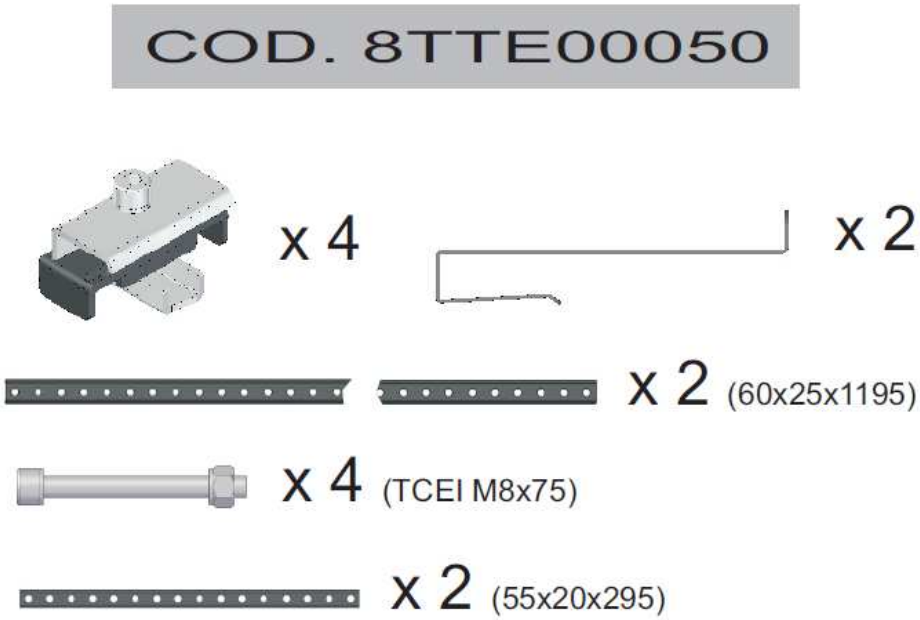
a) Solar collector carton package
b) Fittings package
c) Fixing system package
    a. Rails
    b. Hooks
    c. Screws
d) Antifreeze solar mixture

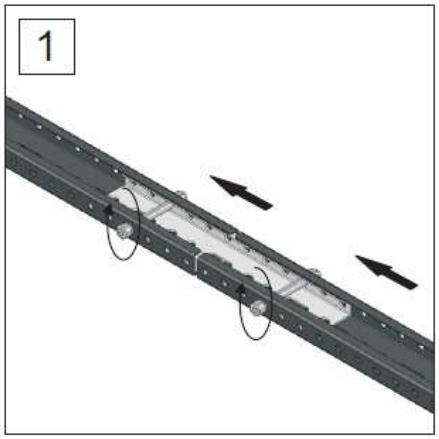
2.2 INSTALLATION POSSIBILITIES

The DTH-CPC collectors can be installed in different ways according to the available anchoring surface:

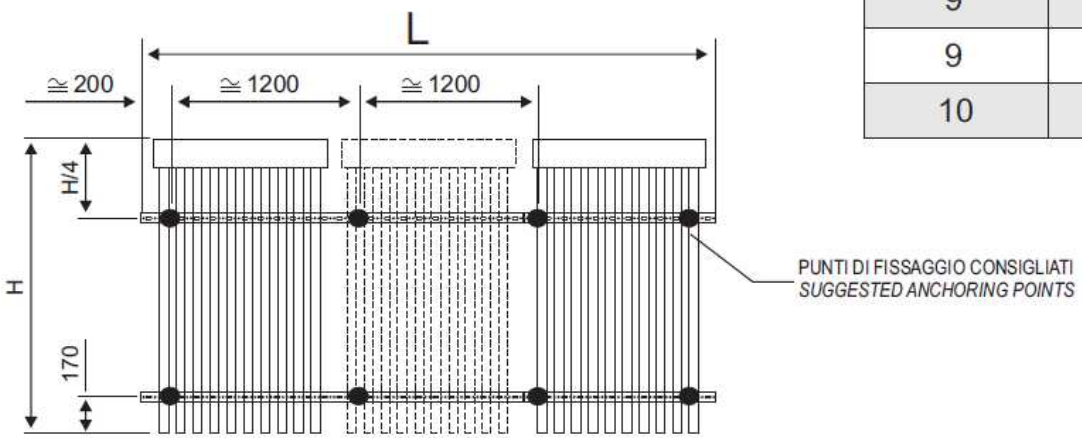
- sloping roof and screws or brackets
- sloping roof and trestle
- flat roof and trestle
- facade

2.2.1 BASE SUPPORT RAIL KIT (COMPOSITION)



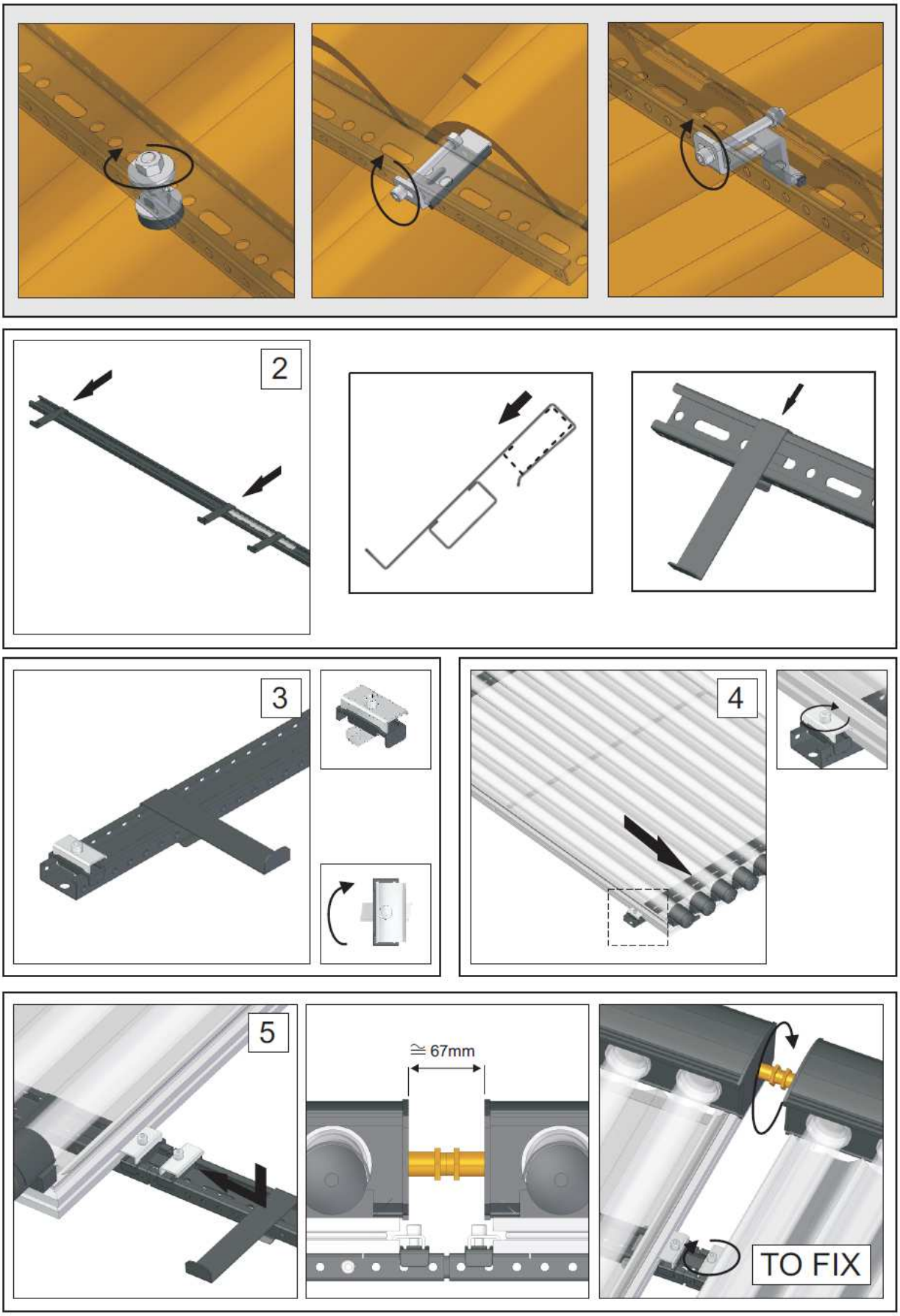


N° collettori	L(mm)=
1	1195
2	2395
3	3595
4	4795
5	5995
6	7195
7	8395
9	9595
9	10795
10	11995



● = PUNTI DI FISSAGGIO CONSIGLIATI
SUGGESTED ANCHORING POINTS

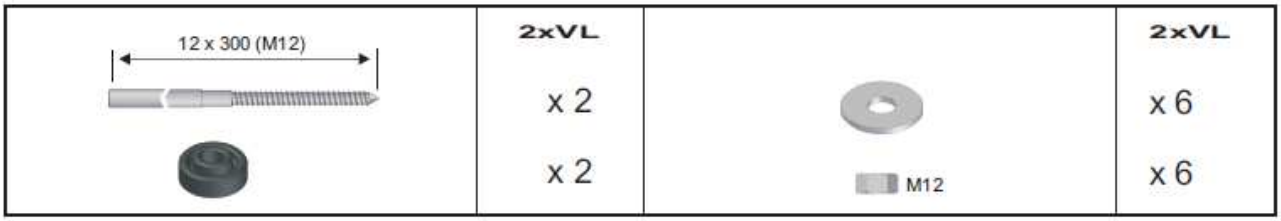
Il carico consentito per il tetto e i punti di fissaggio devono essere controllati sul posto da un esperto di staticaconsiderando le norme vigenti in loco.
Maximum roof load and anchoring points must be verified on site, by an engineer according to local regulations

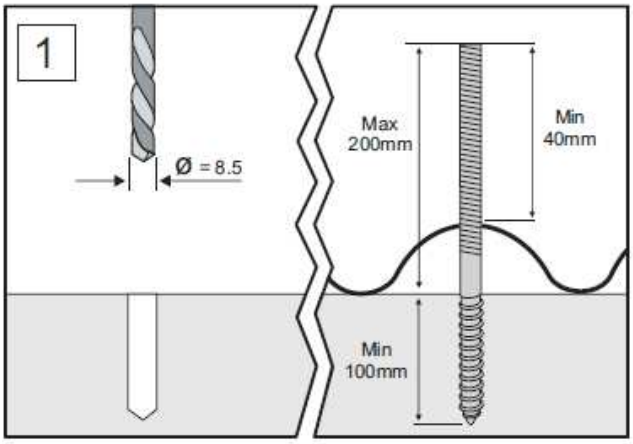

2
3
4
5
≅ 67mm
TO FIX

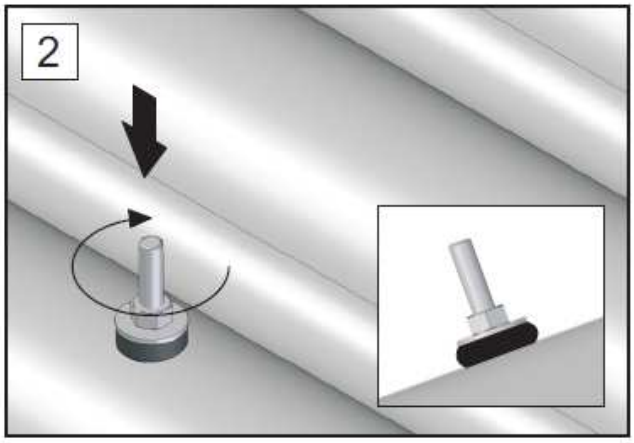
2.2.2 TITLED ROOF INSTALLATION

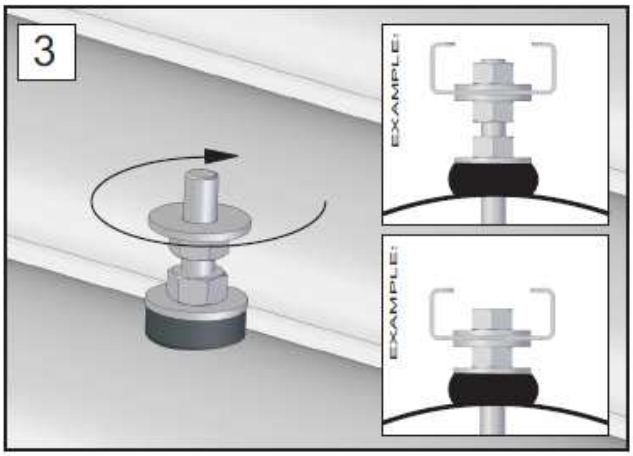
ATTENZIONE:

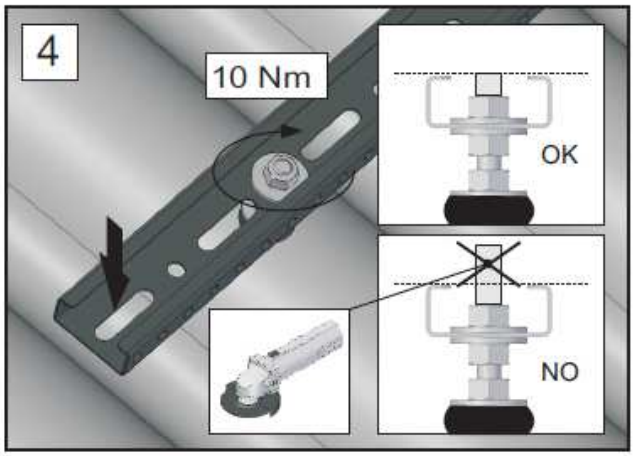
La confezione non contiene i tasselli necessari al fissaggio della barra filettata sulla superficie sottostante la copertura. L'installatore dovrà utilizzare ancoranti opportuni a seconda del tipo di struttura di applicazione e del materiale usato per costruirla. Si consiglia l'uso di ancoranti chimici. Prima di procedere con la foratura verificare il luogo di installazione e segnare con precisione i punti di fissaggio delle viti, tenendo presente che queste non dovranno interferire con altri componenti del telaio (morse, sicurezze, ecc). Le posizioni dei possibili punti di fissaggio sono riportati sullo schema nel retro, ma possono essere modificati a seconda delle forme e dei tipi di copertura.







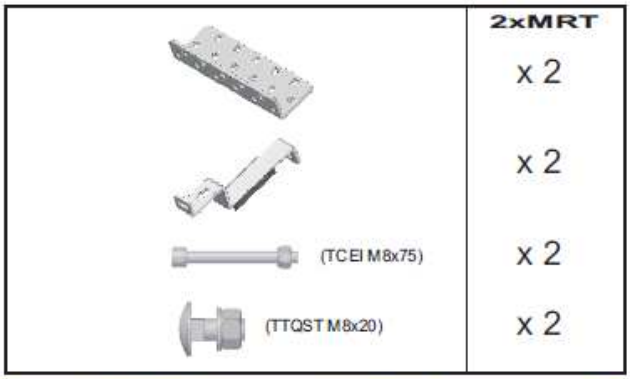


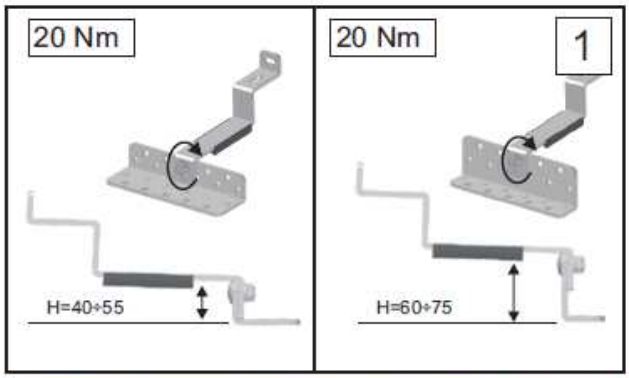


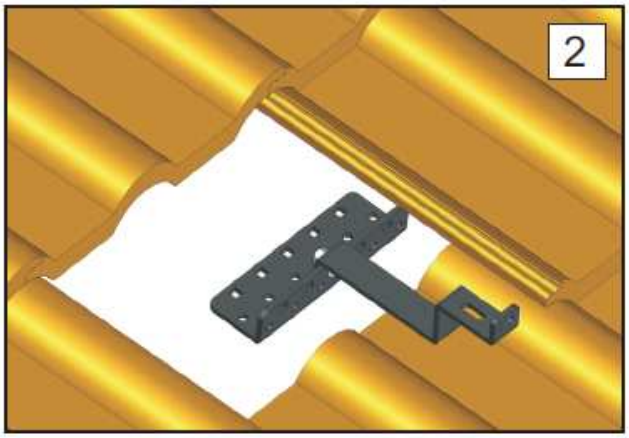
Installation with adjustable hooks

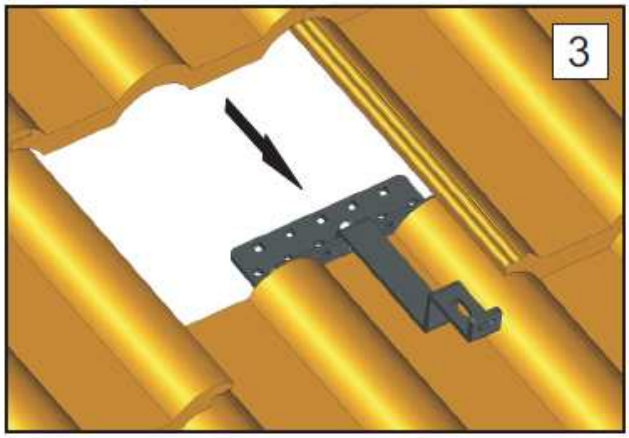
ATTENZIONE:

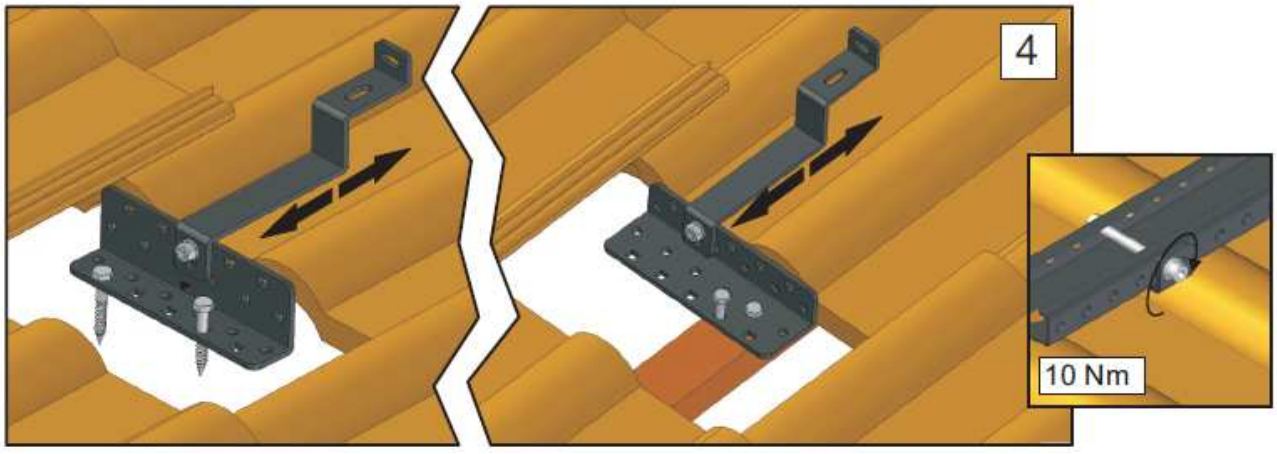
La confezione non contiene viti e tasselli necessari al fissaggio della mensola sulla superficie sottostante ai coppi. L'installatore dovrà utilizzare viti/tasselli opportuni a seconda del tipo di struttura di applicazione e del materiale usato per costruirla. I pesi dei pannelli ed eventuali pesi aggiuntivi sono sostenuti dalla mensola MRT, che a sua volta si appoggia alla tegola, per tanto si deve valutare bene la portata delle tegole. Le posizioni dei possibili punti di fissaggio sono riportati sullo schema nel retro, ma possono essere modificati a seconda delle forme e dei tipi di copertura.





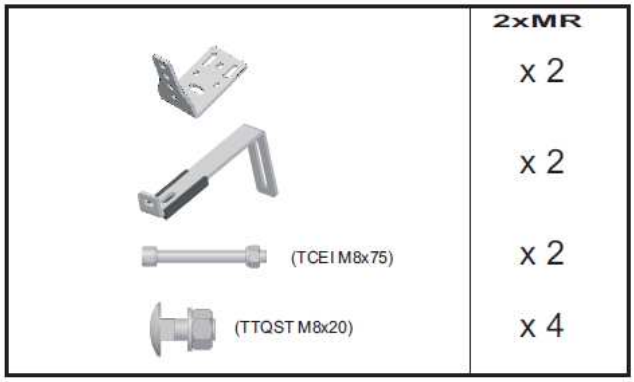


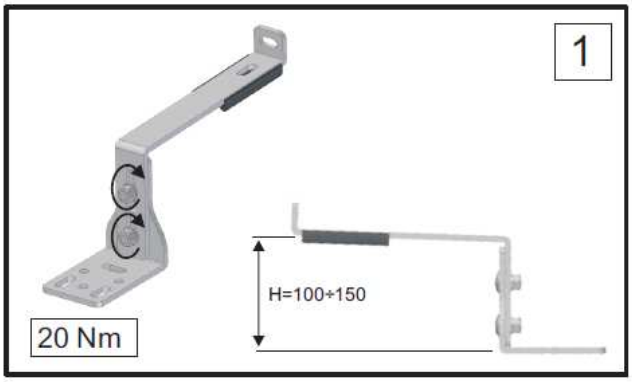


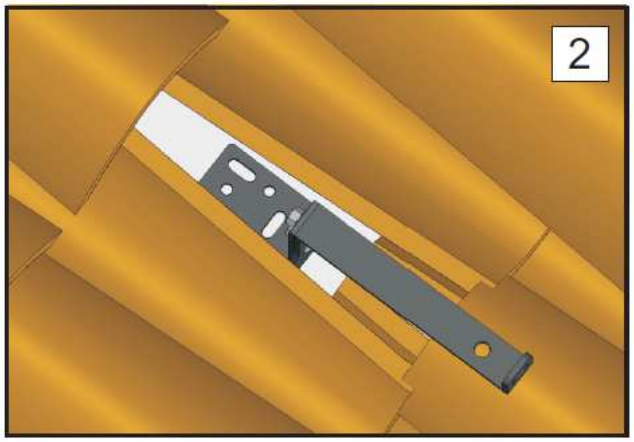


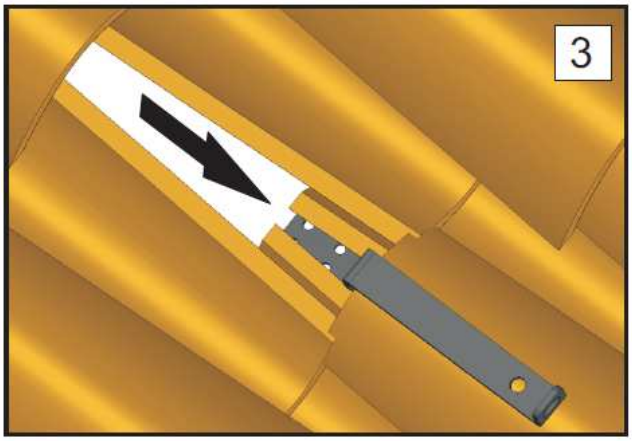
ATTENZIONE:

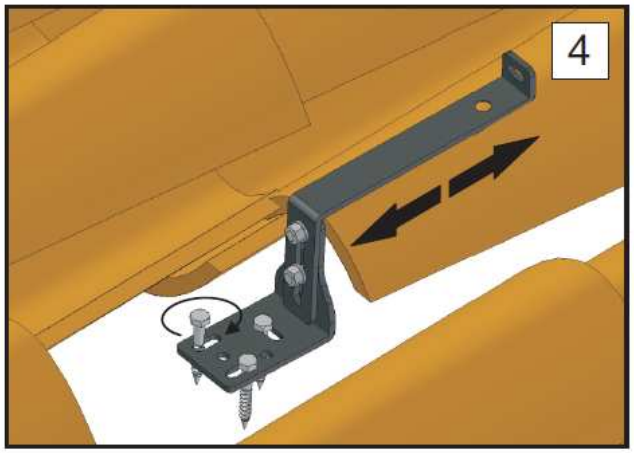
La confezione non contiene viti e tasselli necessari al fissaggio della mensola sulla superficie sottostante ai coppi. L'installatore dovrà utilizzare viti/tasselli opportuni a seconda del tipo di struttura di applicazione e del materiale usato per costruirla. I pesi dei pannelli ed eventuali pesi aggiuntivi sono sostenuti dalla mensola MR, che a sua volta si appoggia al coppo, per tanto si deve valutare bene la portata dei coppi. Le posizioni dei possibili punti di fissaggio sono riportati sullo schema nel retro, ma possono essere modificati a seconda delle forme e dei tipi di copertura.

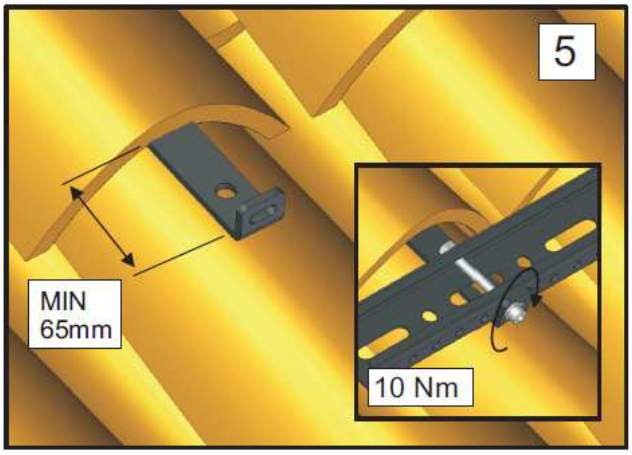




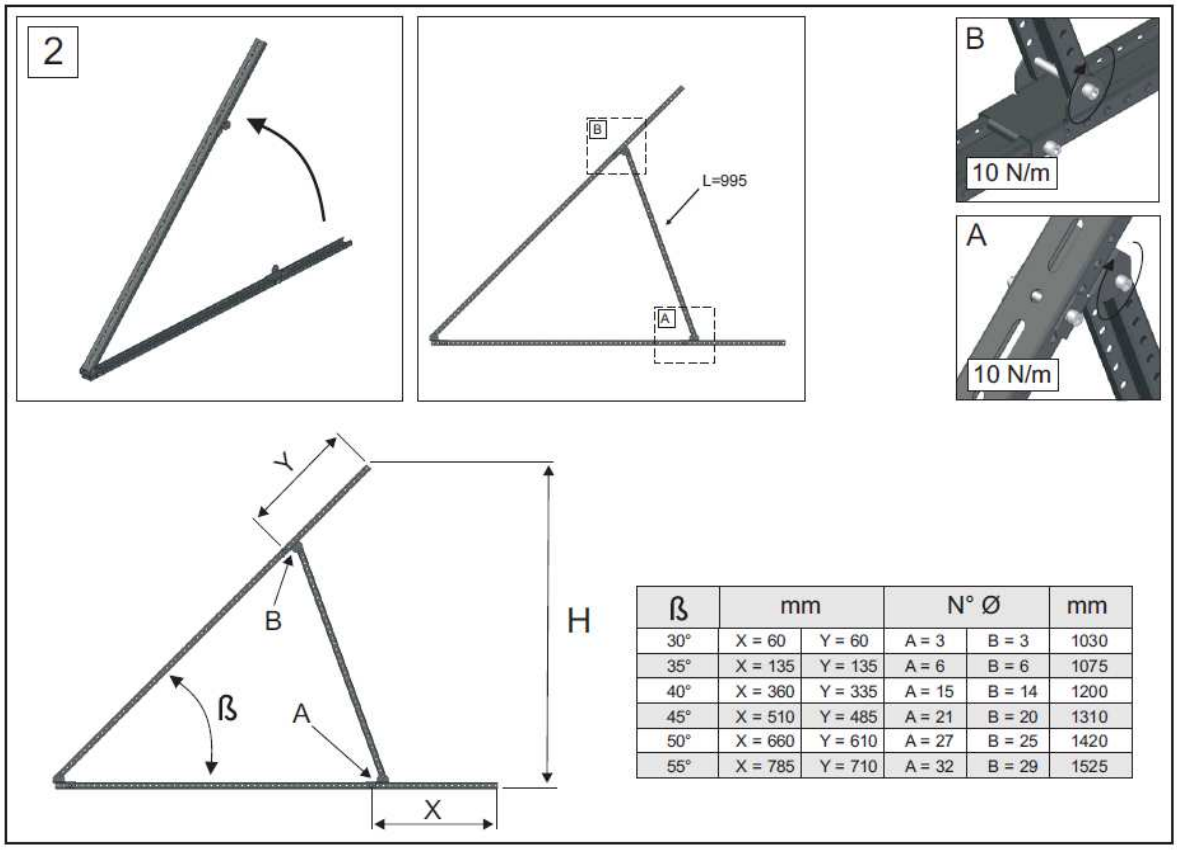




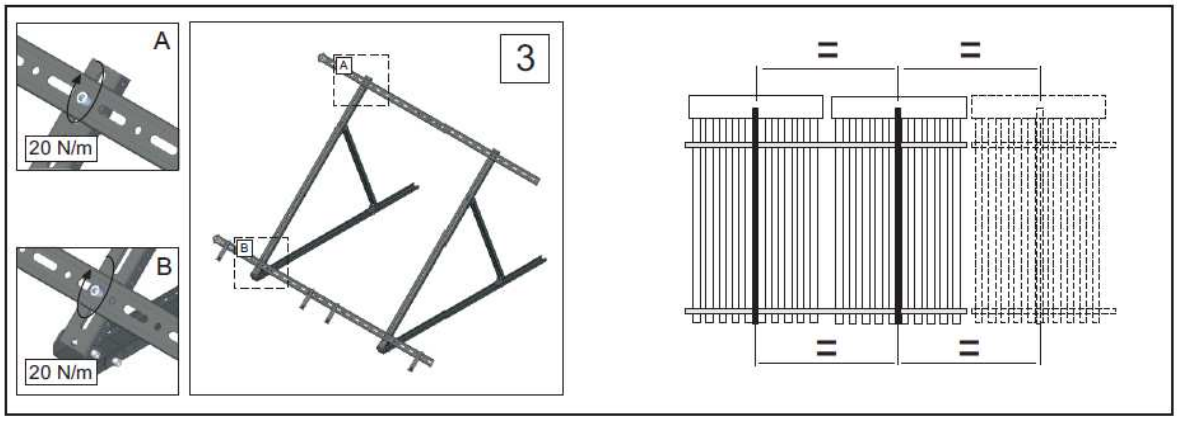


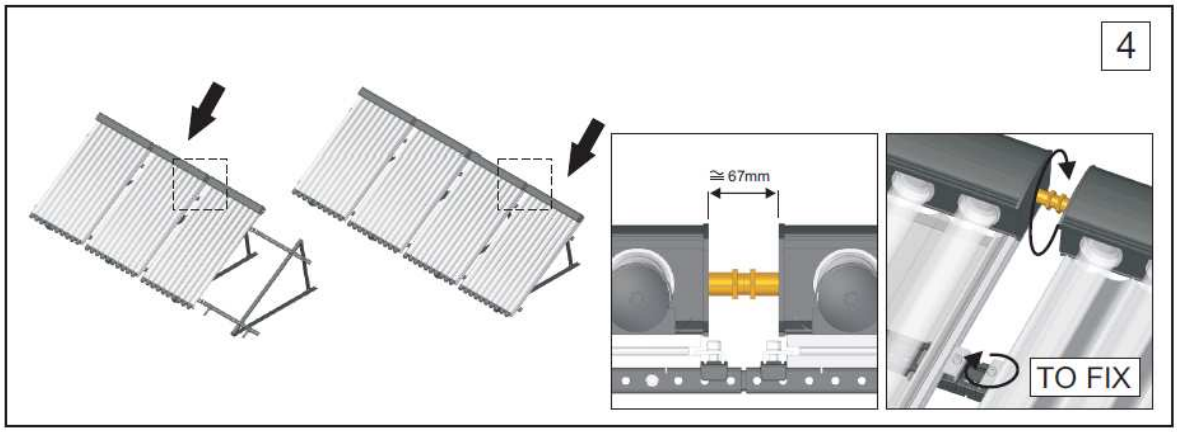


2.2.3 FLAT ROOF INSTALLATION



ß	mm		N° Ø		mm
30°	X = 60	Y = 60	A = 3	B = 3	1030
35°	X = 135	Y = 135	A = 6	B = 6	1075
40°	X = 360	Y = 335	A = 15	B = 14	1200
45°	X = 510	Y = 485	A = 21	B = 20	1310
50°	X = 660	Y = 610	A = 27	B = 25	1420
55°	X = 785	Y = 710	A = 32	B = 29	1525

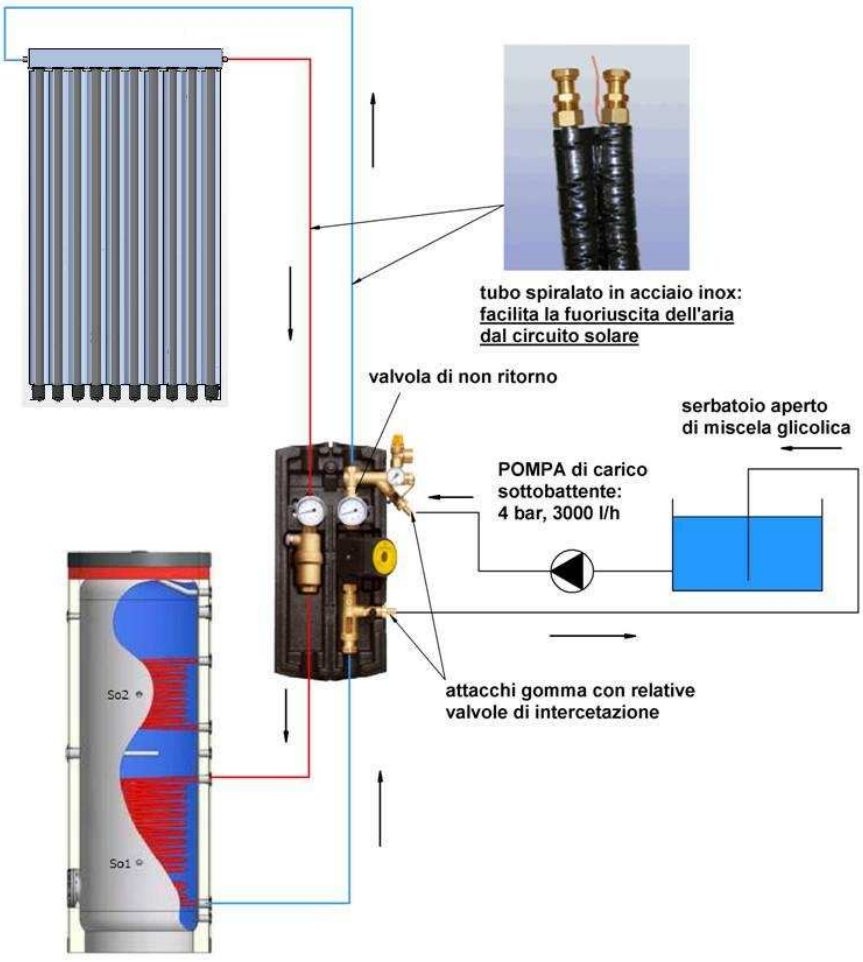




2.3 FILLING THE SOLAR CIRCUIT

The filling of the solar circuit is essential for good operation of the system; we recommend carefully carrying out the operation following the instructions below.

- Use an external filling circuit consisting of (fig. 2.4-1):
  - High flow, high head pump installed below head (e.g. 4 bar, 3000 l/h)
  - Open tank of glycol mixture
  - Rubber hoses
- Connect the delivery side of the filling pump to the hose connection situated on the delivery side of the solar circuit, usually near the connection for the expansion vessel.
- Connect the hose connection usually situated under the solar circulator to the external tank, being careful to ensure that the rubber hose enters the bottom of the tank and not on the surface in order to avoid foam formation.
- Open the shut-off valves situated near the hose connections.
- Using an adjustable spanner, release the non-return valve situated above the circulator and behind the thermometer so that it can fill and no trapped air remains in it.
- Operate the filling pump and make the circuit work until all the air has come out.
- Close the shut-off valves.
- Put the non-return valve back in its initial position.



Operations of purging and filling the system can require a lot of time (even several hours) if the circuit has notable length or elbows in which air can become trapped.

! Carrying out filling operations as described, as a rule it is not necessary to use a "barrel" of air situated at the highest point of the system; if it is installed, it is advisable to exclude it hydraulically with the filling operation complete as this can become a point of possible loss with rises in circuit temperature.

3. SAFETY DIRECTIONS

3.1 GENERAL INSTALLATION RULES

During installation of the solar collectors, follow the safety rules given below. Thermics Srl declines all liability for the consequences of the installer failing to use safety equipment. We therefore advise you to read this chapter very carefully.

	For installations on a roof and/or at height, prepare suitable fall protection devices – harnesses, scaffolding and whatever is necessary to comply with the current construction site safety regulations.		We advise you to wear suitable work gloves while assembling the metal components of the support frame and during installation of the vacuum tubes.
	Use safety harnesses if no other fall protection systems are available.		During the assembly and installation work at height, wear suitable safety shoes to avoid slipping and/or traumas.
	Be careful to avoid contact with exposed and/or unprotected power lines. Make sure you always work in the absence of voltage.		During the assembly and installation work, wear a suitable hard hat.

3.2 INSTALLER SAFETY

During the installation, comply with the information and requirements specified below in order to avoid safety problems and injury to persons or damage to property:

- The metal profiles used for the construction of the fixing frame may have sharp edges and can therefore cause cuts and abrasions: handle them carefully and wear protective gloves.
- Handle the vacuum tubes with care while they are still packed and also after they have been taken out of the box; always wear sufficiently thick gloves to protect yourself from glass splinters in the event of accidental breakage.
- Before installing the vacuum tubes, avoid leaving them in the sun for a long time: the condenser could become very hot and cause burns if touched accidentally. Avoid touching the condenser directly with your hands when you apply the conductive paste.

3.3 SAFETY DEVICES OF THE COLLECTOR AND THE SYSTEM

3.3.1 PROTECTION FROM OVERPRESSURES

The DTH system does not have overpressure safety devices directly integrated in the collector; these must be installed in the solar system. The following must therefore be envisaged:

- A safety valve to allow liquid and steam to escape in the event of excessive pressures in the solar system; this is usually integrated in the circulation unit or must in any case be installed in the thermal power plant.

To prevent any injury to persons and damage to property, you should do the following:

- Connect the safety valve to a suitable vent pipe so as to convey the liquid mixed with steam escaping from the valve to a special drain. The liquid contains non-toxic propylene glycol; however, we advise you not to send it down the sanitary drain pipes but to collect it separately in a collection container.

Note: The maximum working pressure of the solar collector is 6 bar.

3.3.2 PROTECTION FROM ATMOSPHERIC DISCHARGES (LIGHTNING)

To protect the solar collector and the end user from lightning strikes, as a rule, connection of the solar collector to the electrical earthling system is not required; in that regard, we advise you to consult and comply with the local regulations of the place where the collector is installed. On the contrary, connection to earth of the solar system pipes is required. Have this operation carried out only by skilled and authorized personnel in accordance with current local regulations.

3.4 ANTIFREEZE LIQUID SAFETY DATA SHEET

The safety data sheet for the antifreeze liquid supplied by Thermics for filling the solar circuit is shown below. Please read it carefully.

Pietro Carini company founded in 1868	**ZITREC L –10°C**	**SAFETY DATA SHEET** **(Compliant with Regulation 1907/2006/EC)**	
Edition 0 - Version - 0	**20 June 2007**	**Code: 830410**	**Page 1/4**

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY:

1.1 Product Name **ZITREC L –10°C**
1.2 Use Antifreeze
1.3 Distributor: PIETRO CARINI S.P.A. Tel.: +39 2-72560.1
Via Santa Marta, 23 Fax: +39 2-72560.380
20123 Milan MI
Safety Data Sheet Manager:
Dr. Emanuela Bozzi - e-mail: emanuela.bozzi@carini.it
1.4 In the event of emergency, phone:
Transport Emergency Service c/o CNIT - National Centre for Toxicological Information - Pavia
+39 382 525005

2. HAZARDS IDENTIFICATION

Product Classification This product is not classified as hazardous in accordance with Directive 1999/45/EC

Serious consequences to humans following exposure

Inhalation: Can cause slight irritation.

Skin contact: Brief contact can cause slight irritation. Prolonged contact, such as when clothing is soaked with this substance, can cause irritation and more severe discomfort, which can be seen by the presence of local reddening and oedema.

Eye contact: Can induce irritation, which can be felt with the presence of slight discomfort and reddening of the eyes.

Ingestion: No harmful effects expected. If swallowed, can cause abdominal discomfort, nausea and diarrhoea.

Chronic effects on humans following exposure

Medical conditions worsened by over-exposure: There is no evidence that this product makes pre-existing diseases worse.

Effects of exposure on the environment: Not considered toxic to aquatic species.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	% weight	CAS No.	EC No.
Propan-1,2-diol	25 - 30	57- 55-6	200-338-0
Sodium 2-ethylhexanoate	< 5	19766-89-3	243-283-8

Xn R 63 Possible risk of harm to the unborn child.

4. FIRST AID MEASURES

Route of exposure

Inhalation: In the event of irritation, headache, nausea or drowsiness, take the affected person out into the fresh air. Seek medical attention if breathing becomes laboured and symptoms persist.

Skin contact	Wash the skin with plenty of soap and water for several minutes. Seek medical attention if the skin irritation persists or worsens.

Eye contact	Wash the eyes with plenty of water for several minutes. Seek medical attention if the irritation persists.
Ingestion	If the affected person is conscious and can swallow, give two glasses of water (500 ml). Induce vomiting following the instructions of medical personnel. Never give anything by mouth to an unconscious or convulsing person.
Other recommendations	None.

5. FIRE FIGHTING MEASURES

Extinguishing media	Use water fog, dry powder, foam or carbon dioxide extinguisher. Water or foam can cause foam formation. Use water to cool fire-exposed containers. If a leak or spill has not ignited, use water fog to disperse the vapours and to provide protection for personnel attempting to stop the leak.
Extinguishing media that must not be used for safety reasons	Water jet.
Exposure hazards arising from substances deriving from combustion products, resulting gases and preparation of the substance.	None.
Special fire-fighting equipment	The nature of the special protective equipment required will depend upon the size of the fire, the degree of confinement of the fire and the natural ventilation available. Fire-resistant clothing and self-contained breathing apparatus is recommended for fires in confined spaces and poorly ventilated areas. Fireproof clothing is always recommended for any large fires caused by this product.

6. ACCIDENTAL RELEASE MEASURES

Procedures in case of accidental release or leakage	Contain the spill if possible. Dry or absorb using suitable material and remove with a shovel.

7. HANDLING AND STORAGE

Handling	Periods of exposure to elevated temperatures should be reduced to the minimum. Contamination of waters should be avoided.
Storage	Transport, handling and storage in accordance with current local regulations.
Specific use(s)	For correct use of the product, refer to its information sheet.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory protection	Airborne concentrations should be kept to the lowest levels possible. If vapour, mist or dust is generated, use an approved respirator as appropriate. Supplied air respiratory protection should be used while cleaning large spills or upon entry into tanks, vessels, or other confined spaces. See below for applicable tolerated concentrations.
Hand and skin protection	Avoid skin contact. The use of gloves is recommended. If contamination has occurred, wash the exposed part with soap and water.
Eye Protection	Chemical type goggles or face shield are recommended to prevent eye contact.
Exposure limit for the product	Propan-1,2-diol : UK : EH40 : LTEL TWA : 150 ppm ; 474 mg/m^3.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Bluish green
Odour	Slight odour
Flash point (ASTM D92), °C	100 min
Relative density	1.0 kg/l @ 20°C
pH	8.7
Solubility in water	100%

10. STABILITY AND REACTIVITY

Conditions to avoid	Sources of ignition such as naked flames, sparks, hot surfaces.
Materials to avoid	Avoid contact with strong oxidising agents.
Hazardous decomposition products	Carbon oxides, aldehydes and ketones.

11. TOXICOLOGICAL INFORMATION

Acute

By inhalation	High concentrations of vapours or mists may cause irritation to the upper respiratory tract and cause nausea, dizziness, headache and drowsiness.
Skin contact	Slightly irritating to the skin.
Eye Contact	Unlikely to cause more than transient stinging or redness if eye contact occurs.
Ingestion	No harmful effects expected. If swallowed, can cause abdominal discomfort, nausea and diarrhoea.
Chronic	There is no evidence that this product makes pre-existing diseases worse.

12. ECOLOGICAL INFORMATION

Mobility	Not determined.
Persistence and degradability	As per EU regulations: easily biodegradable.
Bioaccumulation potential	For this product, a low bioaccumulation potential is estimated.
Aquatic toxicity	Not considered toxic to aquatic species.
Remarks	Introduction of small amount of the substance should not compromise the operation of water treatment plants. WGK=1

13. DISPOSAL CONSIDERATIONS

Disposal	Dispose of in accordance with local laws and regulations governing disposal of chemical products. EWC-No.: 16 01 15

14. TRANSPORT INFORMATION

Transport	Not regulated.

15. REGULATORY INFORMATION

Classification/labelling information	Under the criteria of Directive 67/548/EEC (dangerous substances) and 1999/45/EEC (dangerous preparations): not classified.

16. OTHER INFORMATION

Text of the risk phrases mentioned in point 2	Xn R 63	Possible risk of harm to the unborn child.

All the information contained in this document and, in particular, information regarding health, safety and the environment, is based on currently available technical and scientific knowledge in relation to each topic. However, the Company accepts no liability for any problems connected with the accuracy or completeness of the information.

Delivery of this document is not of itself intended to obviate the necessity for consumers to make sure the product described here is the most suitable one for their purposes and that the safety and environmental precautions are adequate for their specific aims and situations. Furthermore, the consumer must use the product correctly and comply with all the applicable safety laws and regulations regarding the use of the product.

The Company will not be held liable for personal injury, losses or damage, arising from failure to comply with the safety recommendations and other recommendations contained in this document, or resulting from risks inherent in the very nature of the product, or from its abnormal use.

This sheet is extracted from the supplier's original copy. Version: 2.04 - 28 June 2004

4. MAINTENANCE

4.1 SOLAR COLLECTOR MAINTENANCE

The D-COND collector does not require any particular maintenance on the part of the user, nor are routine cleaning operations prescribed for the vacuum tubes and the reflector.
However, we advise an occasional general planned check of the system (every two years) is advised by the installer/maintenance technician to check:

- the state of the fixing system of the collector on the cover and trestle if present
- the state of the degree of vacuum in the tubes (check the silver ends)
- the state of cleanness of the tubes and the reflector
- the positioning of the temperature probe

Every operation carried out by the user is to be considered their own initiative. Thermics srl is not responsible for any damage to things or injury to people following operations that are non-envisaged, not authorized or carried out under conditions of low safety.

For further information relating to maintenance operations consult the "**USER MANUAL**".

4.2 SOLAR SYSTEM MAINTENANCE

The solar system requires, on the part of the user, simple visual control operations for maintaining the maximum efficiency of the system. We advise a routine check of the:

- pressure indicators on the circuit (they must never fall below the value of 1,5 bar)
- presence of losses to the circuit
- discharge of the safety valve (it must never be blocked)
- state of the electronic controller (read the relevant manual)

! In the event anomalies are discovered contact the installer/maintenance technician.

! Do not on carry out non-authorized operations on the part of the installer/maintenance technician.

For further information relating to maintenance operations consult the "**USER MANUAL**".

However, on the part of the installer/maintenance technician we advise an in-depth check of the entire system every two years. The check should include:

- the state of the thermal protection of the piping
- the positioning of the temperature probes of the collector and the boiler
- pressure indicators on the circuit (they must never fall below the value of 1,5 bar)
- presence of losses to the circuit
- discharge of the safety valve (it must never be blocked)
- state of the electronic controller (read the relevant manual)
- the state of cleanness and quality of the heat-carrying fluid (glycol mixture): in the event that it has deteriorated we advise replacement with the opportunity to clean the circuit internally.

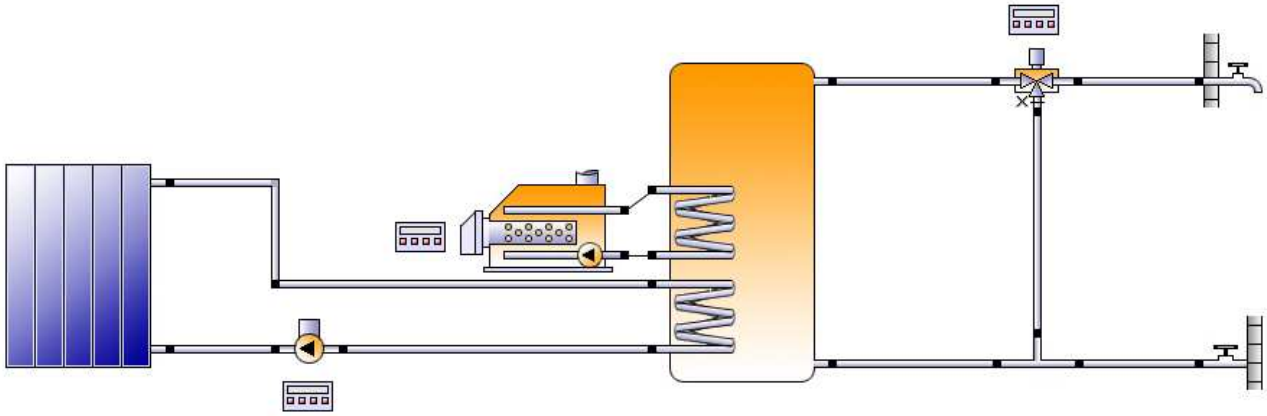
5. FUNCTIONAL DIAGRAMS

5.1 SERIES/PARALLEL DIMENSIONING

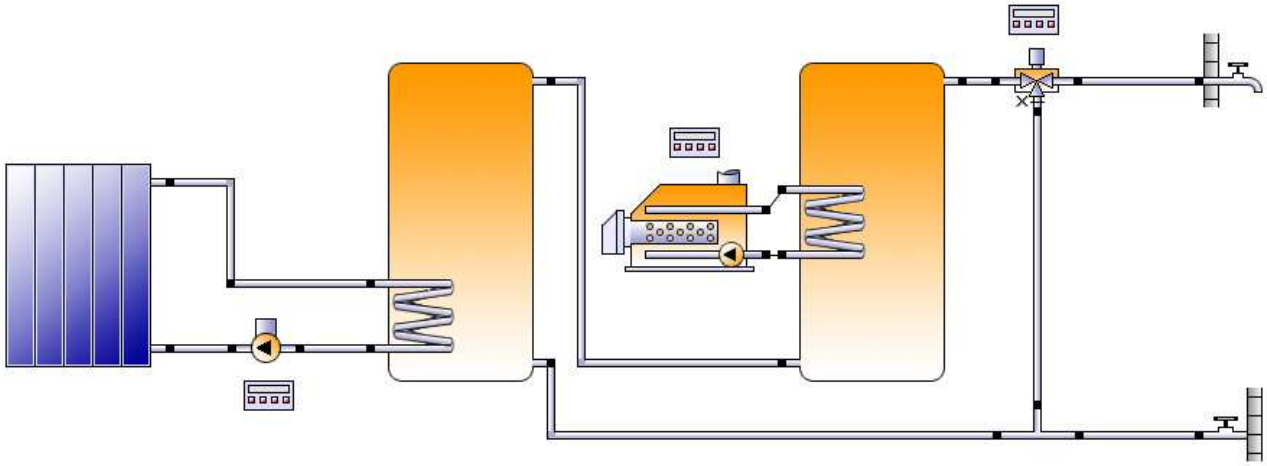
			Hi-flow		Low-flow	
No DTH-CPC 10 Collectors	Dimension flexible pipe	Pumping station	Flow l/min	Rows and parallels	Flow l/min	Rows and parallels
1	DN 15	DN 20	2	1	1	1
2	DN 15	DN 20	4	1	2	1
3	DN 15	DN 20	6	1	3	1
4	DN 20	DN 20	8	1	4	1
5	DN 20	DN 20	10	1	5	1
6	DN 20	DN 20	12	2x3	6	1
7	DN 20	DN 25	14	1x3, 1x4	7	3+4
8	DN 20	DN 25	16	2x4	8	2x4
9	DN 20	DN 25	18	3x3	9	4+5
10	DN 25	DN 25	20	2x5	10	2x5
11	DN 25	DN 25	22	1x3, 1x4, 1x4	11	5+6
12	DN 25	DN 25	24	3x4	12	2x6

The functional diagrams shown below are given by way of example and are not the blueprint and do not replace it. The drawings are the property of Thermics Srl. and any unauthorized reproduction and/or partial use of them is prohibited.

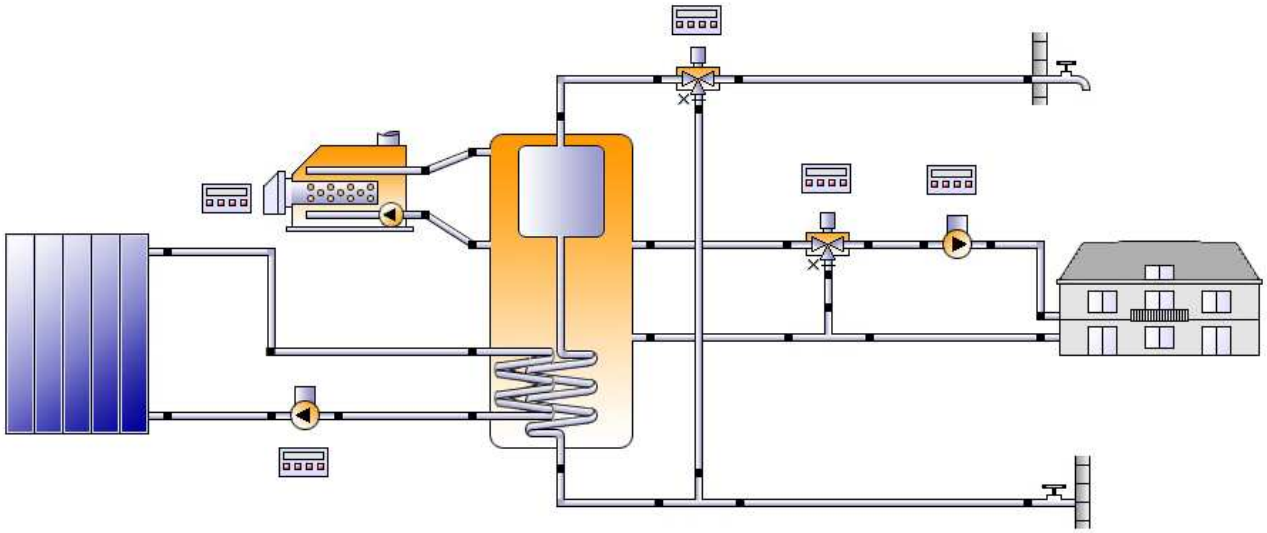
Hot sanitary water solar plant: 2x 10 DTH-CPC collectors and 1 x tanks with 300 litres



Solar plant for hot sanitary water preparation.



Solar plant for hot sanitary water preparation – large pre-heating plants



Solar plant for hot sanitary water preparation and ambient heating support