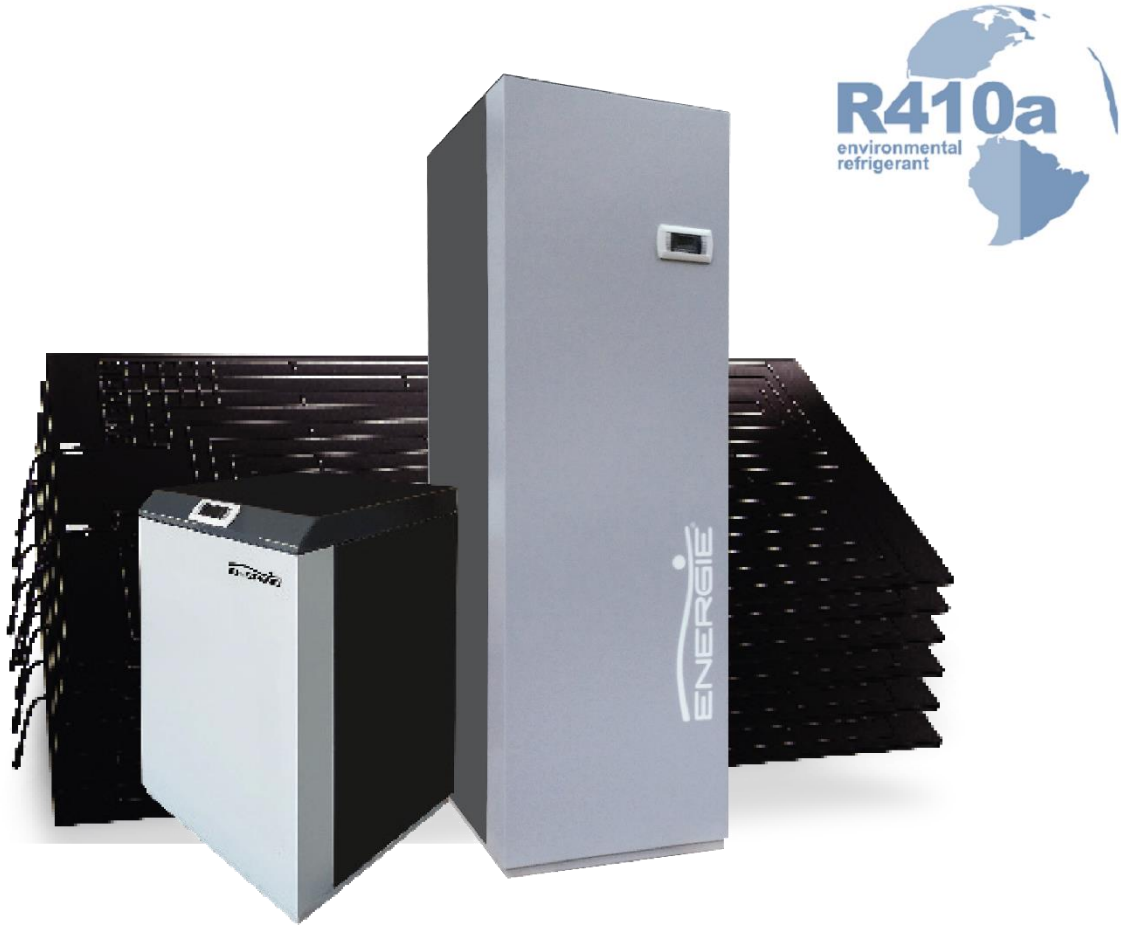
EN

Assembly and user manual

Thermodynamic Solar System

Solar Block ULTRA (CH)
Solar Block ULTRA PLUS (CH+DHW)

CENTRAL HEATING/ DOMESTIC HOT WATER



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According European Certification
EN 60335-1
EN 60335-2-21

INDICE

1. INTRODUCTION

Esteemed Client,

Thank you and congratulations for buying an ENERGIE product, the upshot of several years of experience in the sector.

We have built products based on specific studies, top quality materials and highly advanced technologies.

Our company's serious approach ensures you all the support you'll need from the sizing stage, to installation and assistance.

For the best use of this product, we would ask you to read this instruction manual carefully in which you will find all the indications, information and tips you need to enjoy all the advantages that this appliance has to offer and by following its indications and regulations in force you will be assured of optimum operation and a perfect performance.

The information contained in this document is subject to any modifications deemed necessary to enhance the product without any prior notice.

Our services are always at your disposal. Feel free to call upon us!

2. GENERALITY

2.1. Symbology

The notes/symbols shown can be found throughout the manual. They are intended to indicate and draw attention to certain situations/indications. In this way we seek to ensure any possible problems for the installer or user and assure smooth equipment performance.

Warning / Important Information.

Indicates any potentially dangerous situation which may result in physical injury or material damage.

2.2. Mnufecturer's liability

Our products are manufactured in line with the requirements of the various European directives.
With a constant concern for the quality and performance of our products, we make a continuous effort to improve them. This is why we reserve the right to modify the information described in this document at any time.

As the manufacturers we cease to be liable for the malfunctioning or even breakdown of the equipment whenever:

- The usage instructions are not respected;
- The installation instructions are not respected;
- Lack of maintenance (where required).

2.3. Installer's Liability

The installer is liable for proper equipment installation and for putting into operation. The installer must bear in mind the following notes:

- Read and closely follow the instructions of the manuals supplied with the appliance;
- Carry out installation in accordance with standards in force and required by the manufacturer;
- Carry out the initial start-up of the equipment and verify all the checkpoints;
- Explain the installation to the user as well as how he/she should use the equipment;
- Notify the user of its obligation, where required, as regards equipment maintenance and inspection operations;
- Obligation to provide the user with all the documentation supplied with the equipment (manuals and warranty certificate).

2.4. Safety Information

With a view to protecting the physical integrity of the operator as well as of the equipment, it is vital that all the safety information noted in this manual should be taken into account.

This appliance is not envisaged for use by people (including children) whose physical, sensorial or mental capabilities are reduced or by people without any experience or knowledge, unless they have been given supervision or instructions about use of the appliance by someone responsible for its safety.

Children must be supervised to ensure that they do not play with the appliance.

3. INDICATIONS

This manual accompanies all the "Thermodynamic Solar Block HT 12-32" equipment and contains important instructions which must be followed during installation.

3.1. Unit inspection

The unit was tested and inspected for quality assurance before its dispatch. Carefully inspect the equipment components (Solar Block, Solar Panels etc.) as soon as you receive it in order to check that all the equipment is intact.

Confirm whether all the parts requested have been received in accordance with that which has been specified and whether the type, size and voltage of the unit are correct.

3.2. Lodging a complaint

If damage is identified in the inspection carried out at the time of reception of the unit, describe the damage in the transport reception document. Any transport complaint must be submitted at the act of delivery.
If you are in any doubt, get in touch with ENERGIE to obtain information about how to lodge a complaint with the haulage company.

Should damage occur during transport, do not install the unit. Keep all packaging for inspection of the hauler.

3.3. Embalagem Packaging

The Thermodynamic Block is packed in a bottomless cardboard box and is secured to a treated pinewood pallet using plastic tape.

The thermodynamic solar panels are packed in cardboard boxes unless otherwise provided for.

The dimensions of the boxes, pallets and respective weights for the Thermodynamic blocks are shown in table 1

Model	Box (H*L*P mm)	Pallet (H*L*P mm)	Weight (Kg)
SB 6 ULTRA	1065x752x1002	110x750x1000	98
SB 12 ULTRA			115
SB 16 ULTRA			128
SB 32 ULTRA			135
SB 12 ULTRA PLUS	1880x752x1002	110x750x1000	230
SB 16 ULTRA PLUS			243

Table 1: Dimensions of the boxes, pallets and respective weights

3.4. Transporting the unit

The tools recommended for transporting the unit whilst it is still in the pallet may be: forklift truck or pallet rack. Where possible, the latter must move/transport the unit to the final destination (point of installation).

Pallets truck

Lift truck

When transporting the unit, make sure that you only lift it by its lower part and always with the unit placed on the pallet. Do not try to move the unit without help.

It is vital to follow all the warnings and recommendations stated on the packaging boxes..

3.5. Preparation of installation site

3.5.1. Thermodynamic solar panel

The nature of the site and the inclination angle where the panels are installed are important factors to bear in mind in installation.

To capture the maximum incident solar radiation, the panels must have an inclination of between 10º - 90º with regard to the horizontal and be oriented Southwards. In addition to the factors mentioned above the panels must be at ventilated places and preferably not be exposed to any kind of shade.

It is incumbent upon the installer to comply with all the requirements demanded by ENERGIE and adapt the method for securing the panels in line with the site.

If the panels are subject to adverse atmospheric conditions, in the main strong gusts of wind, it is the responsibility of the installer to strengthen the panel affixation structure.

3.5.2. Thermodynamic Solar Block

The Block installation site must be carefully designed. And before carrying out any procedure you must bear in mind:

- Easy access and sufficient space to move the equipment as far as the installation site;
- Load capacity of the ground (verify the weight of the equipment);
- Leave point for the hydraulic and electrical connections;
- The base of the site where the equipment will be placed must be perfectly even;
- Consider minimum distances with regard to walls, ceilings or any other type of obstacles which may make access difficult, both at the installation as well as in any maintenance operation.

3.5.3. Unit storage

If the unit is not installed immediately, keep it in a safe place protected from the weather in such a way that it does not suffer any kind of damage which may hinder its correct operation.

Poor installation of the unit may give rise to the cancellation of the manufacturer’s warranty.

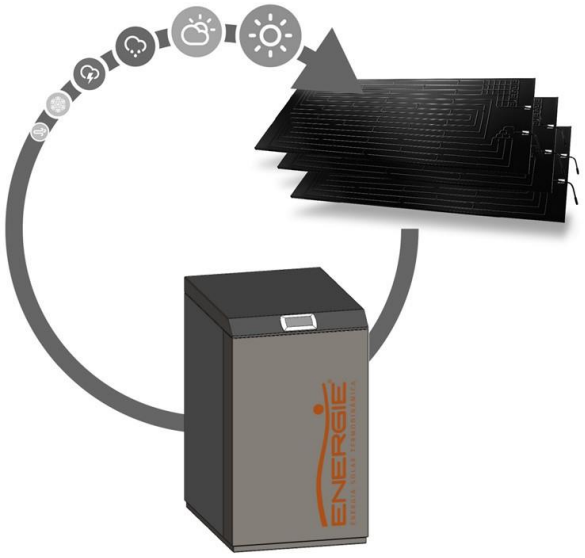
4. THERMODYNAMIC SOLAR BLOCK

4.1. Operation

ENERGIE Thermodynamic Solar Blocks ULTRA are items of equipment intended for climatization: atmosphere, industrial applications etc.

The thermodynamic panel is placed on the exterior and it ensures the capturing of energy as regards:

- Direct and diffuse radiation;
- Outside air by natural convection;
- Wind effect (almost always to be found);
- Rainwater



The temperature difference brought about by the previous factors ensures that the fluid will change to vapour state inside the panel.
The compressor aspirates the refrigerant fluid (vapour) of the panel, raising the pressure and temperature thereof, which is transmitted to the water circuit by way of a heat exchanger.
The heat exchanger is located inside the thermodynamic group (Solar Block), providing heat to the water.
When the refrigerant fluid reaches the expansion valve it is at its liquid phase and the load loss owing to strangulation reduces the pressure and the fluid is re-prepared for entry into the panels.

4.2. Components

The Thermodynamic Group is made up of two components:

a) Thermodynamic Group;
b) Thermodynamic solar panels

The solar panel is a plate made of twin-channel pressed aluminium with post-pressing anodic oxidation. The panel has the dimensions 2000 mm x 800 mm x 20 mm and it has a fluid flow entry and exit in a copper-aluminium tube with an interior diameter of ¼''

5. TECHNICAL SPECIFICATIONS

5.1. Solar Block 6 ULTRA / ULTRA PLUS

		Unid.	Description	Description
Model	---	---	SB 6 ULTRA	SB 6 ULTRA PLUS
Heating capacity (1)	Heating range		3,5 – 10,2	
	Max. heating capacity		10,2	
Heating capacity (2)	Nominal heating capacity	kW	8,5	
	Nominal power consuption	kW	1,71	
	COP	---	4,97	
DHW (3)	Load profile	---	---	L
	water heating energy efficiency	%	---	146
	Energy efficiency class	---	---	A+
	AEC	kWh/a	---	701
	COP	---	---	3,44
Electrical data	Main power	V~	230~	
	Max power	kW	2,75	
	Frequency	Hz	50/ 60	
Compressor	Typology	---	Twin Rotary / Inverter	
	Number	---	1	
Evaporator (Thermodynamic solar panel)	Number	---	6	
	Material	---	Aluminum	
	surfece	m²	9,6	
Refrigerante	Type	---	R410A	
	Min load	Kg	1,9	
Hydraulic circuit	Nominal flow	m^3/h	1,7	
	Nº of pumps	---	1	
	Typology	---	EC	
	Max power consuption	W	60	
DHW tank	Volume	L	---	200
	Material	---	---	AISI 316
	Backup electrical heater	W	---	1500
Hydraulic connections	Water outlet	inches	1”	1”
	Water inlet	inches	1”	1”
	DHW input	inches	---	¾”
	DHW output	inches	---	¾”
Sound (4)	Internal unit	db(A)	55	
	Evaporator	db(A)	13	
Weight	Without pallet	Kg	115	208

(1) Acording EN14511; Air temperature DB/WB 7°C/6°C; Water temperature inlet 30°C/ outlet35°C; Solar radiation 400w/m²;
(2) Acording EN14511; Air temperature DB/WB 14°C/13°C; Water temperature inlet 30°C/ outlet35°C; Solar radiation 800w/m²;
(3) According EN 16147, A 14 / W 10-54
(4) Distance from unit 10m;

5.2. Solar block 12 ULTRA/ ULTRA PLUS

		Unid.	Descrição	Descrição
Model	---	---	BS12 ULTRA	BS12 ULTRA PLUS
Heating capacity (1)	Heating range		5 - 19	
	Max. heating capacity		18,7	
Heating capacity (2)	Nominal heating capacity	kW	10,3	
	Nominal power consuption	kW	2,15	
	COP	---	4,8	
DHW (3)	Load profile	---	---	L
	water heating energy efficiency	%	---	143
	Energy efficiency class	---	---	A+
	AEC	kWh/a	---	714
	COP	---	---	3,38
Electrical data	Main power	V~	230 | 400	
	Max power	kW	5,7	
	Frequency	Hz	50/ 60	
Compressor	Typology	---	Twin Rotary / Inverter	
	Number	---	1	
Evaporator (Thermodynamic solar panel)	Number	---	12	
	Material	---	Aluminum	
	surfece	m²	19,2	
Refrigerante	Type	---	R410A	
	Min load	Kg	3,5	
Hydraulic circuit	Nominal flow	m^3/h	1,6	
	Nº of pumps	---	1	
	Typology	---	EC	
	Max power consuption	W	60	
DHW tank	Volume	L	---	200
	Material	---	---	AISI 316
	Backup electrical heater	W	---	1500
Hydraulic connections	Water outlet	inches	1”	1”
	Water inlet	inches	1”	1”
	DHW input	inches	---	¾”
	DHW output	inches	---	¾”
Sound (4)	Internal unit	db(A)	61	
	Evaporator	db(A)	13	
Weight	Without pallet	Kg	115	230

(1) Acording EN14511; Air temperature DB/WB 7°C/6°C; Water temperature inlet 30°C/ outlet35°C; Solar radiation 400w/m²;
(2) Acording EN14511; Air temperature DB/WB 14°C/13°C; Water temperature inlet 30°C/ outlet35°C; Solar radiation 800w/m²;
(3) According EN 16147, A 14 / W 10-54
(4) Distance from unit 10m;

5.3. Solar Block 16 ULTRA

		Unid.	Descrição	Descrição
Model	---	---	BS16 ULTRA	
Heating capacity (1)	Heating range		8-26	
	Max. heating capacity		26,8	
Heating capacity (2)	Nominal heating capacity	kW	16,2	
	Nominal power consuption	kW	3,47	
	COP	---	4,7	
Electrical data	Main power	V~	400	
	Max power	kW	7,8	
	Frequency	Hz	50/ 60	
Compressor	Typology	---	Twin Rotary / Inverter	
	Number	---	1	
Evaporator (Thermodynamic solar panel)	Number	---	16	
	Material	---	Aluminum	
	surfece	m²	25,6	
Refrigerante	Type	---	R410A	
	Min load	Kg	4,5	
Hydraulic circuit	Nominal flow	m^3/h	2,8	
	Nº of pumps	---	1	
	Typology	---	EC	
	Max power consuption	W	60	
Hydraulic connections	Water outlet	inches	1”	
	Water inlet	inches	1”	
Sound (3)	Internal unit	db(A)	62	
	Evaporator	db(A)	13	
Weight	Without pallet	Kg	128	

(1) Acording EN14511; Air temperature DB/WB 7°C/6°C; Water temperature inlet 30°C/ outlet35°C; Solar radiation 400w/m²;
(2) Acording EN14511; Air temperature DB/WB 14°C/13°C; Water temperature inlet 30°C/ outlet35°C; Solar radiation 800w/m²;
(3) Distance from unit 10m;

5.4. Solar Block 32 ULTRA

		Unid.	Descrição
Model	---	---	BS 32 ULTRA
Heating capacity (1)	Heating range		18,5 – 48,2
	Max. heating capacity		48,2
Heating capacity (2)	Nominal heating capacity	kW	39,6
	Nominal power consuption	kW	8,1
	COP	---	4,91
Electrical data	Main power	V	3N~/ 400V
	Max power	kW	13,2
	Frequency	Hz	50/ 60
Compressor	Typology	---	Twin Rotary/ inverter
	Number	---	1
Evaporator (Thermodynamic solar panel)	Number	---	32
	Material	---	Aluminum
	Surface	m²	51,2
Refrigerante	Type	---	R410A
	Min load	Kg	7
Hydraulic circuit	Nominal flow	m^3/h	6,5
	Nº of pumps	---	1
	Typology	---	EC
	Max power consuption	W	80
Hydraulic connections	Water outlet	inches	1” ¼
	Water inlet	inches	1” ¼
Sound (4)	Internal unit	db(A)	55
	Evaporator	db(A)	13
Weight	Without pallet	Kg	135

(1) Acording EN14511; Air temperature DB/WB 7°C/6°C; Water temperature inlet 30°C/ outlet35°C; Solar radiation 400w/m²;

(2) Acording EN14511; Air temperature DB/WB 14°C/13°C; Water temperature inlet 30°C/ outlet35°C; Solar radiation 800w/m²;

(3) Distance from unit 10m;

6. INSTALATION

6.1. Installation tools required

To ensure correct assembly of the equipment, the installing technician must be endowed with the following tools:

Manometers (low and high pressure)	Refrigerant gas cylinder
Vacuum pump	Blowpipe (welding)
Refrigerant gas loading station or scales	Copper rods with 40% of silver
Pipe cutter; Tube bender; Tube expander	Descaler
Screwdriver; Rotoblock wrench	Adjustable spanner
Measuring tape	Set of hydrant keys or ratchet

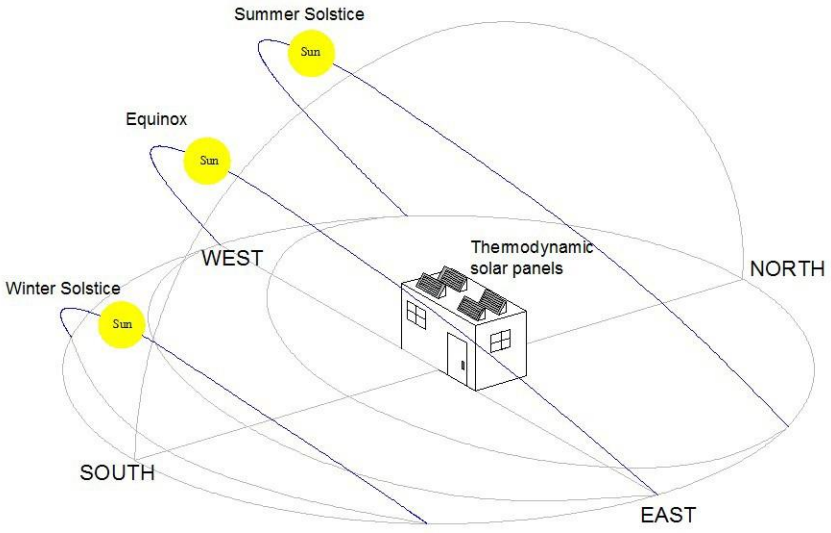
To verify the operationality of the equipment the installing technician must have at its disposal:

- Multimeter;
- Appliance for measuring temperature;
- EVD display

6.2. Thermodynamic Solar Panel

6.2.1. Panel orientation

ENERGIE panels must preferably be oriented in a southerly direction, but they may also have an orientation towards Northeast and Northwest.

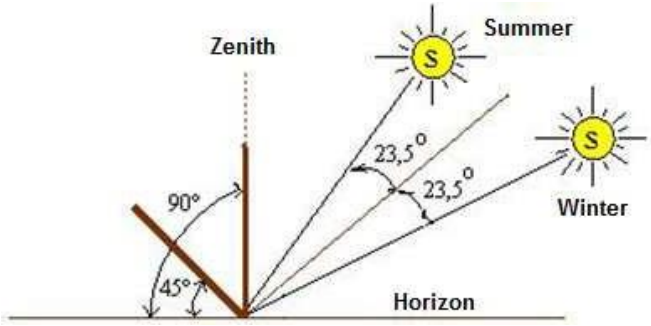


6.2.2. Panel Inclination

The inclination angle of the sun rays with regard to the horizontal varies in accordance with the seasons of the year. In Winter, at the Zenith, the solar rays form an angle of 20º to 40º with regard to the horizon. In Summer the angle is between 60º and 80º.

To get the most out of the solar rays on the panel, it's best to choose an inclination between 45º and 90º.

However, you may install the panels with another inclination in certain situations.



6.2.3. Distance

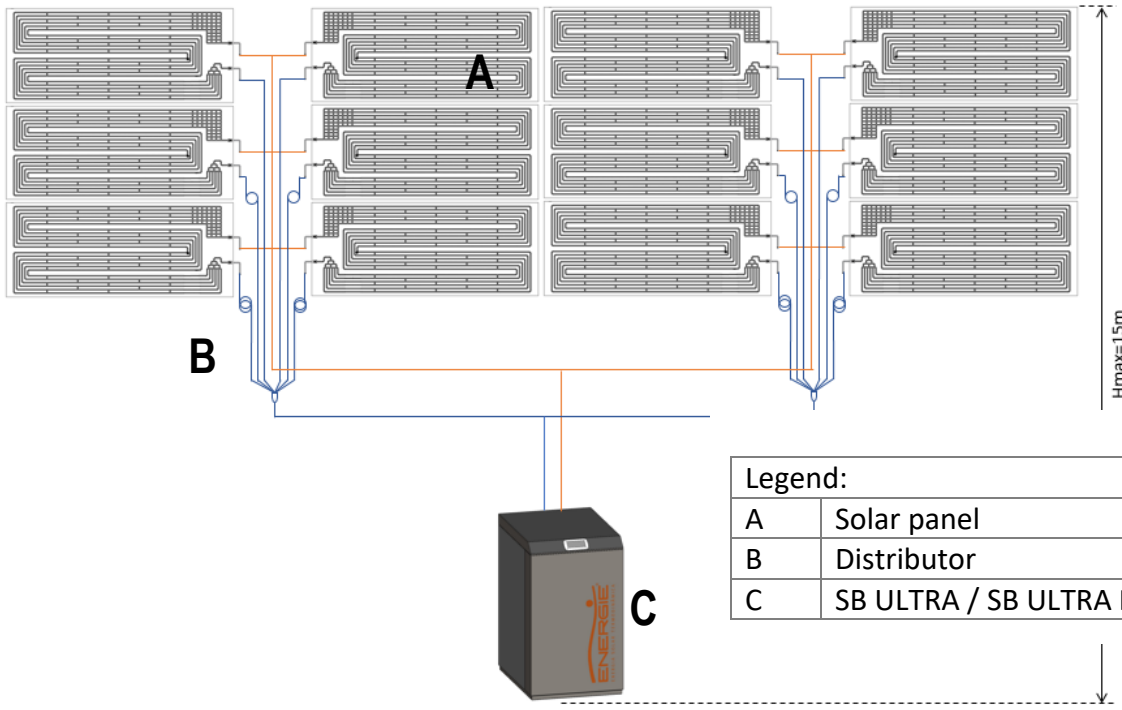
The maximum distance between the panels and the Thermodynamic Block depends on certain factors such as the equipment model, the no. of curves, the piping diameter etc.
However, we would recommend that the distance should not exceed the following values:

- Solar block 6 and 12 → 15m;
- Solar block 16 → 20m;
- Solar block 32 →30m.

For Installations with a distance greater than those indicated must contact the Technical Dept.

6.2.4. Unevenness

Under normal circunstances the total maximum gradient must always be less than 15 mts.
However, there are situations where it is not possible to respect these distances, in these cases you must consult our technical department.
The aspiration piping must rise above the level of the panels, in the same way as the distribution shaft in order to avoid the rapid siphon effect of the liquid when the compressor stops.



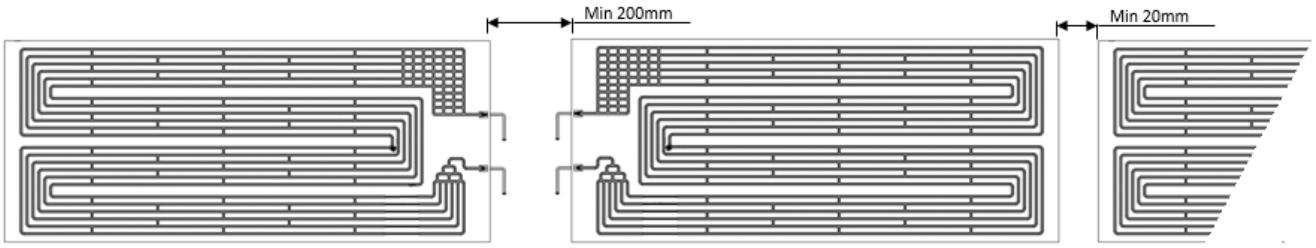
Legend:	
A	Solar panel
B	Distributor
C	SB ULTRA / SB ULTRA PLUS

6.2.5. Standard Gap of the Panels

The position of the panels and the choice of the sides of the connections must be carried out so as to limit the length of the piping and simplify the connections.

The panel gap is determined so as to facilitate its placement and the implementation of the connections between piping, though due consideration must be given to:

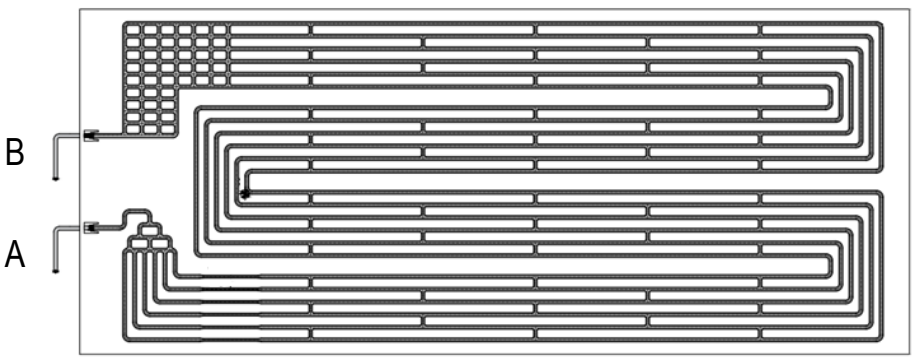
- Minimum space between the panels on the connections' side: 200mm (ideal space: 500mm);
- Space between the panels on the side opposite the connections: they should preferably not be completely stuck together (preferably> 20mm).



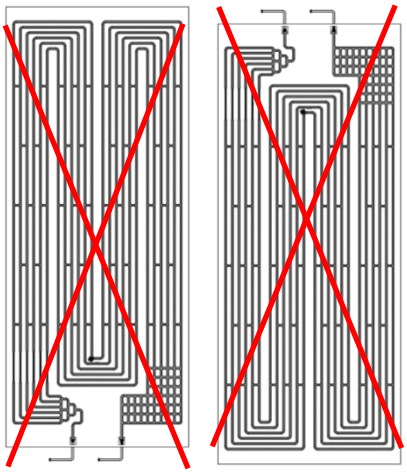
6.2.6. Direction of the panels

The direction of the panels is defined by the outlets of the tubes pointing downwards and by the view of the front part of the panel. They must always be placed with the largest length horizontally and the connections pointing downwards. In this context two panel models are manufactured:

Left panel



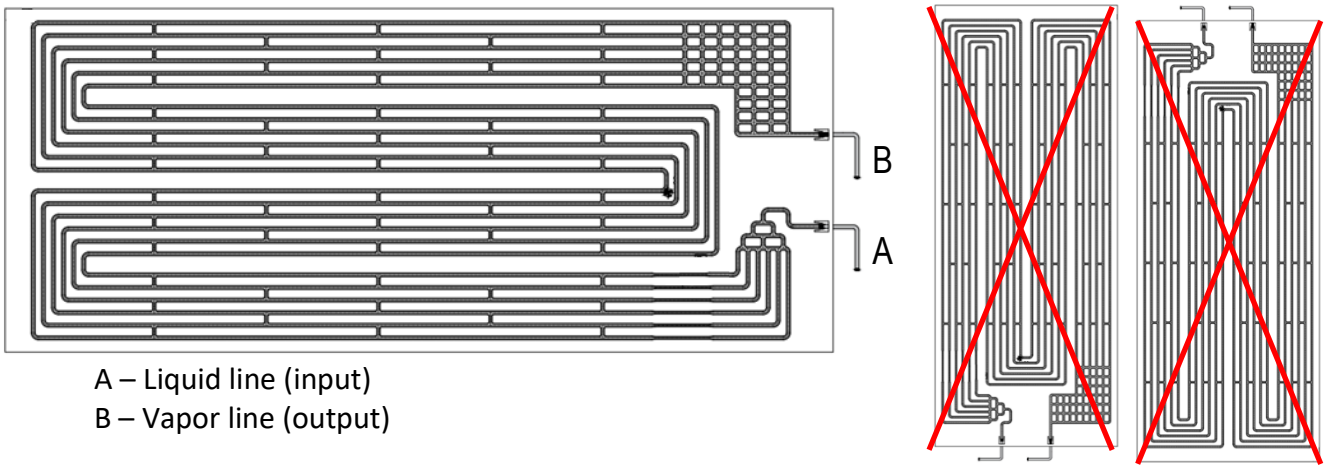
A – Liquid line (input)
B – Vapor line (output)



A left-hand panel is installed on the right (front view). To this end, it has connections on the left side.

The Solar panel must not be installed on the vertical in accordance with the representation indicated above with a red cross.

Right panel



A – Liquid line (input)
B – Vapor line (output)

A right-hand panel is installed on the left-hand side (front view). To this end, it has connections on right- hand side.

The Solar panel must not be installed on the vertical in accordance with the representation indicated above with a red cross.

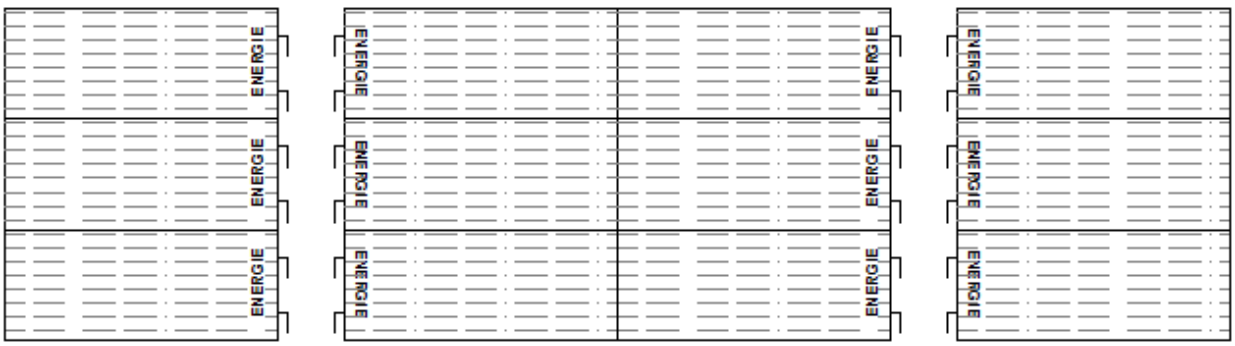
6.2.7. Solar panels layout

The relative position of the panels depends on the system to be installed, the availability of the installation area, the architectonic integration etc.

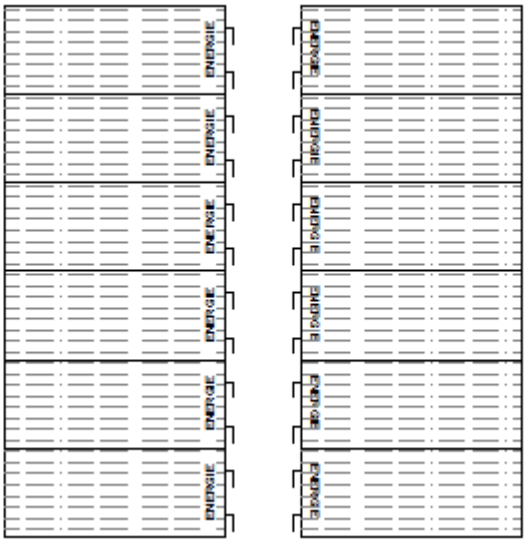
In the diagrams below some of the possible positioning layouts of the panels are represented. However, you may consult the annex for complementary information about the position of the panels in the installation.

Example: Solar Block 12 Ultra

a)



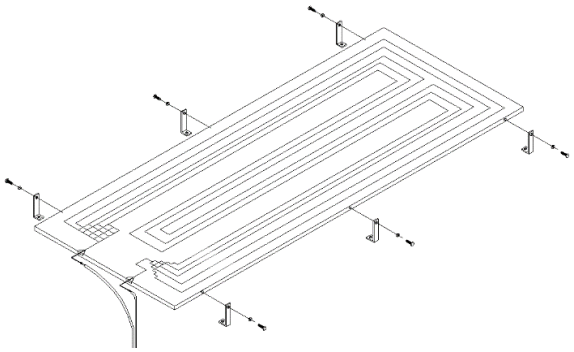
b)



In the event of some other positioning of the panels, you must contact our Technical Department.

6.2.8. Fixation

The affixation of panels depends on the installation site and the method and type of affixation is the installer's decision. However, you must bear various factors in mind (described above such as, for example, distance, orientation…).
For a correct affixation of the panels, as regards the physical part of the affixation supports they must have a sturdy structure in line with the circumstances of the site. Each panel must be secured at 6 points (as a minimum).
The image below illustrates an example of the fixation used:



The fixation of the panels is ensured by aluminium brackets*. The support is bent in "L" shape with two M8 through holes. The bracket base is secured to the roof (where applicable) using an M6 screw and a plastic plug or a female thread (depending on the situation).
The other support rib is secured to the panel by way of galvanised M6 screws to prevent corrosion situations.

* The aluminium brackets are not supplied with the SB

The Panels must have a minimum gap of 50cm (from the previous and/or subsequent panel)

If the panels are subject to adverse atmospheric conditions as, strong gusts of windn, snow, etc. it is the responsibility of the installer to strengthen the panel affixation structure.

6.2.9. Liquid Distributor and Collector, placement and connection

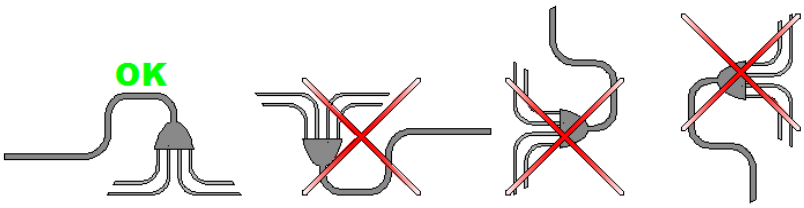
To ensure that the fluid reach the panels in homogeneous fashion, a liquid distributor must be installed. This same distributor includes as many distribution tubes as there are panels in the installation.

The distributor is placed between the panels. The connection tubes to the panels must have strictly the same length and their ends connect directly to the panels.

The distributor and the collector may be placed before the installation of the panels for the sake of convenience (obstruction, passage of distribution tubes behind the panels).

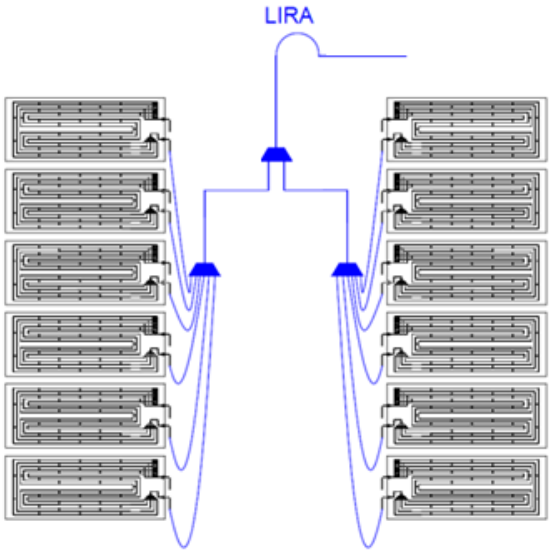
Only remove the tube protection cover at the time of connection to the power and aspiration shafts with a view to avoiding the penetration of impurities.

Install the distributor (s) vertically, face downwards (never horizontally!), thereby ensuring that the fluid reaches the panels in homogeneous fashion.



If a shaft is too long for the length required, it must be rolled up and never cut.
If it is wished to shorten or elongate, this operation must be carried out on all the shafts with the same diameter.

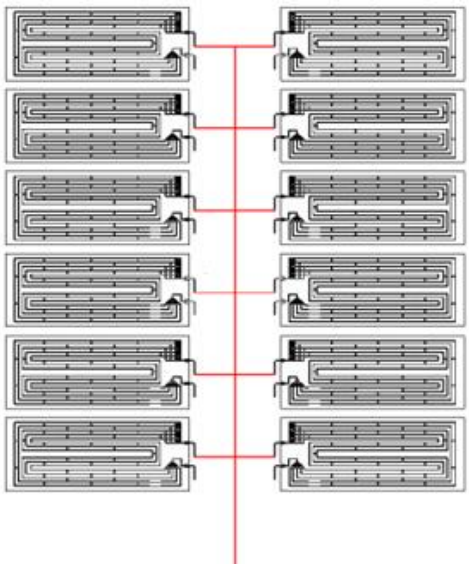
All ø ¼" shafts must be welded to the lower connections of the panels (liquid inlet). The shafts of the main distributor must be welded to the secondary distributors.



It is vital that the power shafts (Ø 1/4'') should have the same length and the same is true of the main distributor shafts

Depending on the Thermodynamic Block model and the position of the panels, one or more aspiration collectors must be carried out.

The aspiration which allows the collection of the refrigerant fluid in its gaseous state must regroup all the panel aspiration outlets (Ø 3/8'') as far as the collector. This is shown in the figure below.



All the shafts must be welded to the upper panel outlets.

It is important for the connections at the collectors to be as simple as possible, respecting the instructions in the event of any unevenness.

It is essential for the copper tubes used to be refrigerant type CUDHP according to the ISO1337 and/or according to EN12735, both on the aspiration line and on the liquid line (power).

It is also recommended for all the piping to have good quality thermal insulation in order to avoid any possible condensation.

The piping diameters vary with the system model as can be seen in the table below.

Modelo	Vapor line	Liquid line
Solar Block 6 ULTRA	3/4"	1/2"
Solar Block 12 ULTRA / PLUS	3/4''	1/2''
Solar Block 16 ULTRA	7/8''	3/4''
Solar Block 32 ULTRA	1" 3/8	7/8"

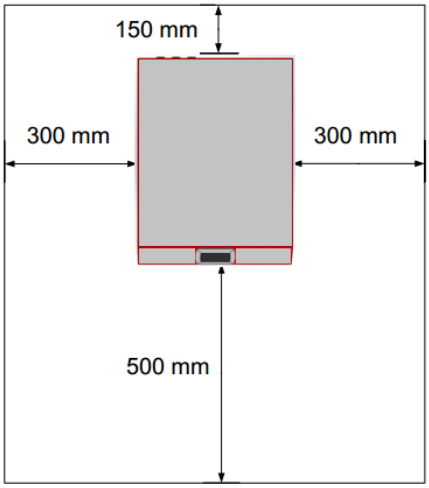
6.3. Thermodynamic Block

6.3.1. Installation site

The choice of site where the Thermodynamic Block is placed is very important and must be carried out bearing mind a certain number of criteria such as:

- Accessibility;
- Proximity of the boiler, with the latter serving as a support system or even in the event of the replacement thereof;
- Avoid the possibility of vibration transmission;
- Place anti-vibration supports between the appliance and the ground;
- Position of the piping from the panels;
- Protected from bad weather such as garages, cellars, attics etc.;
- Allow any possible assistance intervention.

As regards the rear panel of the equipment and the installation site the installer must respect a minimum distance of 150mm to allow easy access to the hydraulic and refrigerant connections.



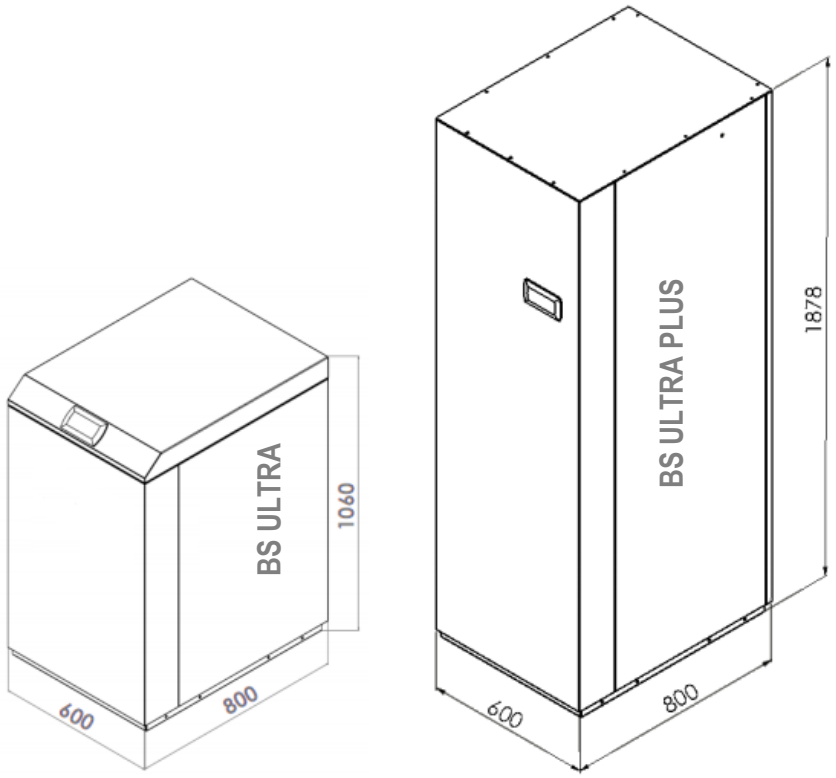
The installation of the Block near bedrooms should be avoided owing to the possible transmission of vibrations and noise.

If the block is placed in the attic special care must be taken as regards the vibrations produced under the wooden construction. Also provide for the placement of a tray under the appliance in accordance with legislation to collect any water in the event of an installation rupture.

Never grab nor handle the Thermodynamic Block by the refrigerant or hydraulic connections.

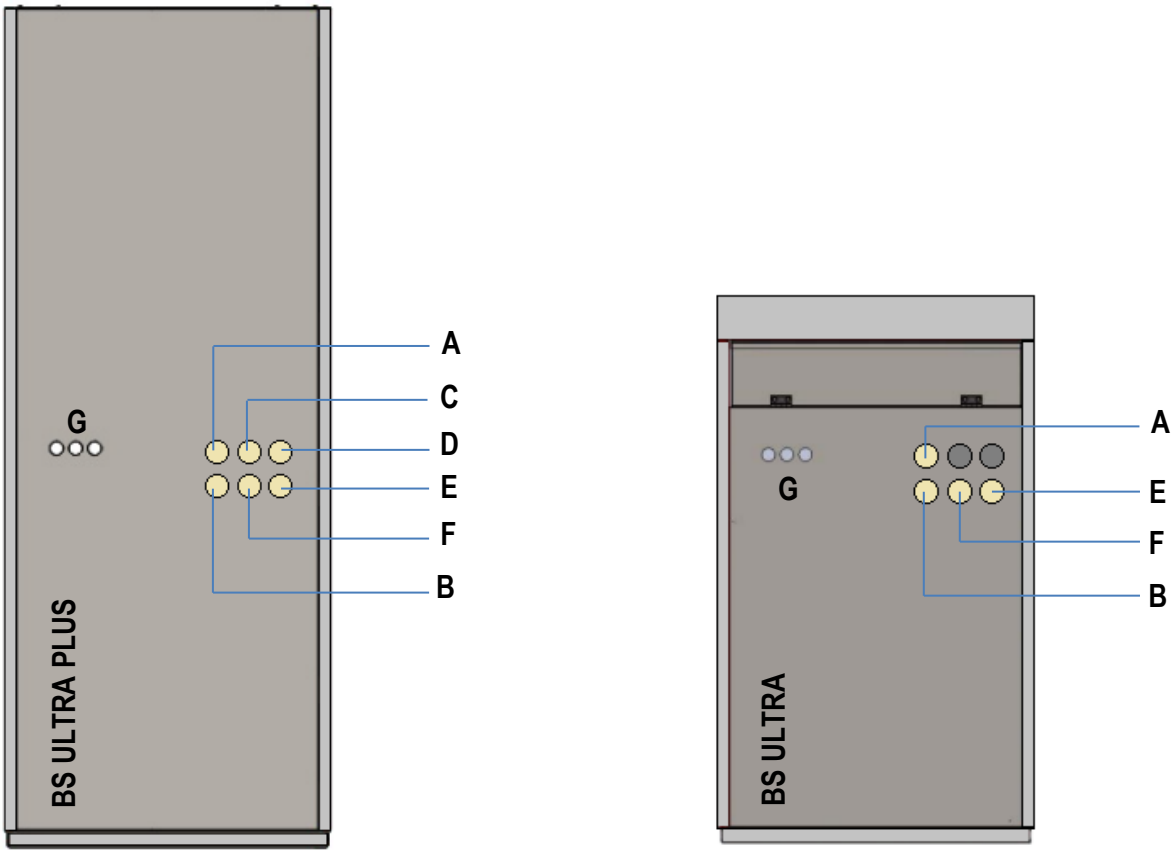
6.3.2. Dimensions

The external dimensions of the equipment depend on the configuration (Ultra or Ultra Plus). The following figures show the external dimensions of the equipment.

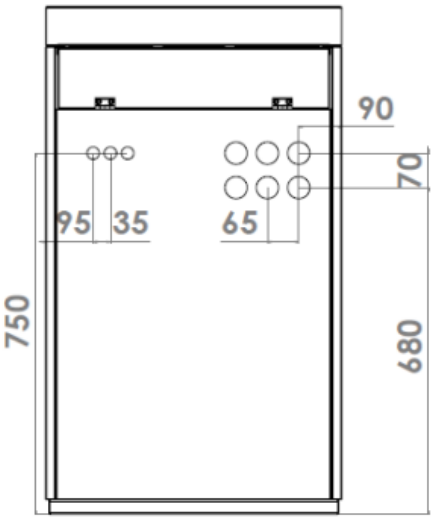


6.3.3. Connections SB ULTRA and SB ULTRA PLUS

The back of the Thermodynamic Block has the various connections in accordance with the designation set out below.



	Description	BS ULTRA 6 Ø (inches)	BS ULTRA 12 Ø (inches)	*BS ULTRA 16 Ø (*inches*)*	BS ULTRA 32 Ø (inches)
A	Water outlet ()	1	1	1	1” 1/4
B	Water inlet (AC)	1	1	1	1” 1/4
C	Inlet water (DHW)	----	3/4	3/4	----
D	Hot water outlet (DHW)	----	3/4	3/4	----
E	Suction line or vapor line (return of panels)	3/4	3/4	7/8	1” 3/8
F	Liquid line (out to panels)	1/2	1/2	3/4	7/8”
G	Electrical connections	****	****	****	****
CH – Central Heating / DHW- domestic hot water					



Note: The dimensions of the rear connections of the BS ULTRA and BS ULTRA PLUS equipment are the same.

6.3.4. Implementation of piping connections (welds)

Once the Panels are installed and the Block has been finally placed at the site, now the following types of piping must be placed:

- Liquid (Outward to panels);
- Aspiration (Return from panels).

Before making the aforementioned connections, it is best to carry out the connections of the panel tubes to the:

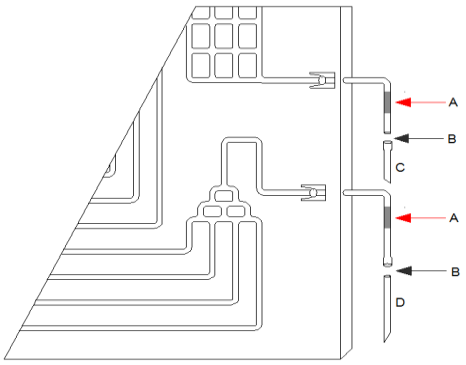
- Liquid distributor (s);
- Aspiration collector (s)

The implementation of the connections is one of the most delicate points of the whole installation and it is extremely important that the welds are carried out in line with all the basic criteria of a quality welding process.

The recommended welding type for implementing the piping connection is oxy-acetylene welding (oxygen/acetylene). Other types of gas may also be used such as propane, for example.

The most delicate welds and which require the greatest care are carried out at the panels. It is necessary to place a damp fabric strip which must envelop the “Thermoretractable Joint” so that it is duly protected from high temperatures caused by the blowlamp flame as shown in the figure below.

Legend:	
A	Thermoretractable Joint
B	Connection and Weld
C	Aspiration Line (panel outlet)
D	Liquid Line (panel inlet)



The copper is heated until it goes dark red at which point welding must begin. Bring the slightly inclined welding rod closer without exposing it to the flame. As a general rule, the quantity to be applied is the same as one and a half times the tube diameter. As soon as the alloy expands, stop heating and let it cool.
As soon as the weld is in a solid state, you must cool the whole area around the weld immediately with a damp cloth.

Welds alongside the Thermodynamic Block must also be carried out with due care so as not to burn any component of the block.

After completing all the operations, the system is ready for submission to the leak test and the whole refrigerant fluid loading process.

6.3.5. Inlet / Outlet connection of the panels to the Solar Block

The ULTRA / ULTRA PLUS Solar Block leaves the factory with nitrogen loading (30bar). Take care when cutting the connections on the equipment

Before cutting the pipes (liquid line and steam line) make sure that the equipment is in the correct position in order to avoid splicing the lines.

After cutting each pipe turn its end down and proceed with the deburring. Then after weld the lines.

The welds next to the thermodynamic block must be made carefully to avoid burning any of block’s components.

6.3.6. Leak test

After all connections have been made, load the refrigerant circuit with nitrogen at 15 bar (Max). Then check all the welding’s with a leakage detector or soap foam, making sure there are no leaks.

The solar panels should be left under nitrogen pressure during 2 to 3 days to ensure there is no leakage. After this operation, remove all nitrogen from the installation.

The nitrogen loading must not exceed 15bar. Higher pressures can cause irreversible damage to the panels.

6.3.7. Vacuum

Before loading the refrigerant fluid, it is essential to vacuum the installation. The vacuum is intended to remove all air and moisture from the circuit.

The vacuum pump must be connected by means of pressure gauges to the suction line (rotolock valve) and to the liquid line (access valve located after the expansion valve), in order to ensure that the vacuum is carried out throughout the entire refrigeration circuit.

The vacuum time depends on the following factors:

- Volume in m3/h of the vacuum pump;
- Volume of the system piping;

On average, the minimum vacuum time to be carried out at an installation, depending on the system installed, is shown in the table below.

Solar Block	6 ULTRA/ ULTRA PLUS	12 ULTRA/ ULTRA PLUS	16 ULTRA	32 ULTRA
Minimum vacum time (hours)	3	6	8	12

Once the vacuum process has been completed, the taps of the vacuum pump are closed. The vacuum manometer must always have the same display after stopping the pump, thereby ensuring that the installation maintains the vacuum.

After vacuuming, do not remove the hoses until the system is fully pressurized by the refrigerant.

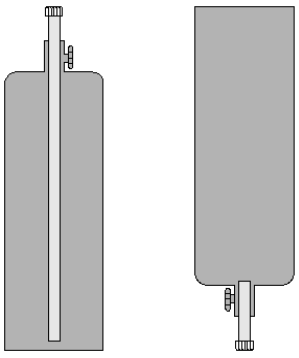
6.3.8. Refrigerant load

R410a is an azeotropic mixture (fluid composed of more than one component). Because this is an azeotropic fluid, care must be taken regarding the installation load. If we charge an installation with an azeotropic refrigerant in the steam state, there is a risk that one of the components of the fluid will vaporize before the others, and therefore, the installation will have a greater ratio of that component.

Therefore, the installation **must be carried out with the refrigerant in the liquid state**. Most containers have a siphon, however it is a good idea to check it out.

To load liquid, proceed as shown in the figure below.

Refrigerant charge from a siphon bottle.



Refrigerant charge from a non-siphon bottle.

For proper operation of the SB ULTRA and SB ULTRA PLUS, the refrigerant loads mentioned in the following table must be carried out.

Solar Block	6 ULTRA/ PLUS	12 ULTRA / PLUS	16 ULTRA	32 ULTRA
Recommended load (kg)	1,9	3,5	4,5	7,0

Depending on the type of the installation, a supplementary refrigerant charge may be required.

If required, the system shall be extra loaded through the liquid line (access valve located after the expansion valve) very slowly and with the compressor running.

After charging the refrigerant, the high pressure (connection in the liquid tank) must be equalized with the liquid line (connection after the expansion valve).

7. ULTRA PLUS SOLAR BLOCK (ACTIVATE DHW BACKUP RESISTANCE)

The ULTRA PLUS Solar Block has a backup immersion electrical resistance of 1500W in the DHW storage tank.

The electrical resistance could be manually activated in case any problem occurs with the equipment.

To activate the electrical resistance, it is necessary to connect the plug at the back of the equipment to the socket (230V ~)

The resistance has an integrated thermostat that is regulated to heat the water up to 55°C.

8. ULTRA SOLAR BLOCK (ACTIVATE DHW CONTROL)

The ULTRA Solar Block is set by default to perform central heating only. To activate the control of the DHW circuit it is necessary to activate the digital input DI7, terminals 29 and 30 on the control board. The input is activated with a dry contact or by a simple “bridge”.

After activating the digital input, the water temperature probe (B03), terminals 1 and 2 of the control board, must be installed in the water tank.

The temperature probe for the DHW circuit is supplied with the equipment.

By default, the priority of the equipment is set for the DHW circuit, only then it reverses to the central heating circuit.

The management of the 3-way valve (reversing for CH or for DHW) is done automatically by the equipment.

The 3-way valve must be connected to the terminals mentioned in the following table:

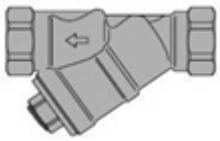
Terminal	Conductor	Description	Output
42	Yellow/ green	groud	3 way valve (CH/ DHW)
43	Brown	Permanent Phase	
44	black	Permanent Phase	
45	blue	Neutral	

9. HYDRAULIC CONNECTION

The installation of the hydraulic system must be carried out by a competent professional, always respecting the indications supplied by ENERGIE.

Upon the initial installation and before establishing any hydraulic connection of the heating circuit to the Thermodynamic Block, the whole hydraulic installation must be cleaned to remove any dirtiness, remains of material and similar impurities.

After carrying out the cleaning of the circuit, connect it to the Thermodynamic Block, placing, without fail, a filter at the return water inlet as an accumulation of residues in the condenser may bring about a system malfunction. The figure below illustrates the type of filter to be used.



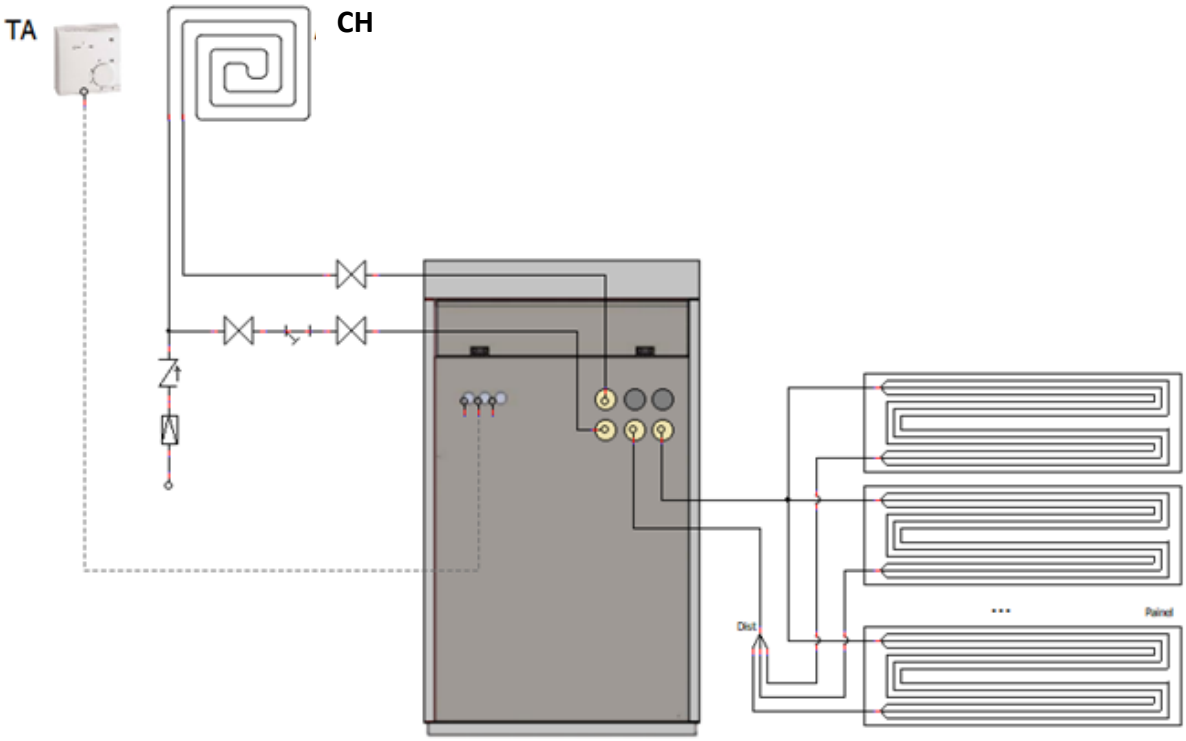
When the circuit is properly connected, fill the hydraulic circuit and as this operation is being undertaken, you must purge all the circuits, ensuring that you eliminate all the air pockets from the installation.
As a precaution you must carry out a leak test. The test must be carried out with pressure 1.5 times the working pressure.

When installing the Thermodynamic Block along with another heating device we must bear in mind and place the Thermodynamic Block in parallel with the existing equipment.

Firstly, preferably choose low temperature heat emitters with a large exchange surface (underfloor heating, convectors, ventilo-convectors) as they allow distribution at a low temperature and better performances to be obtained.

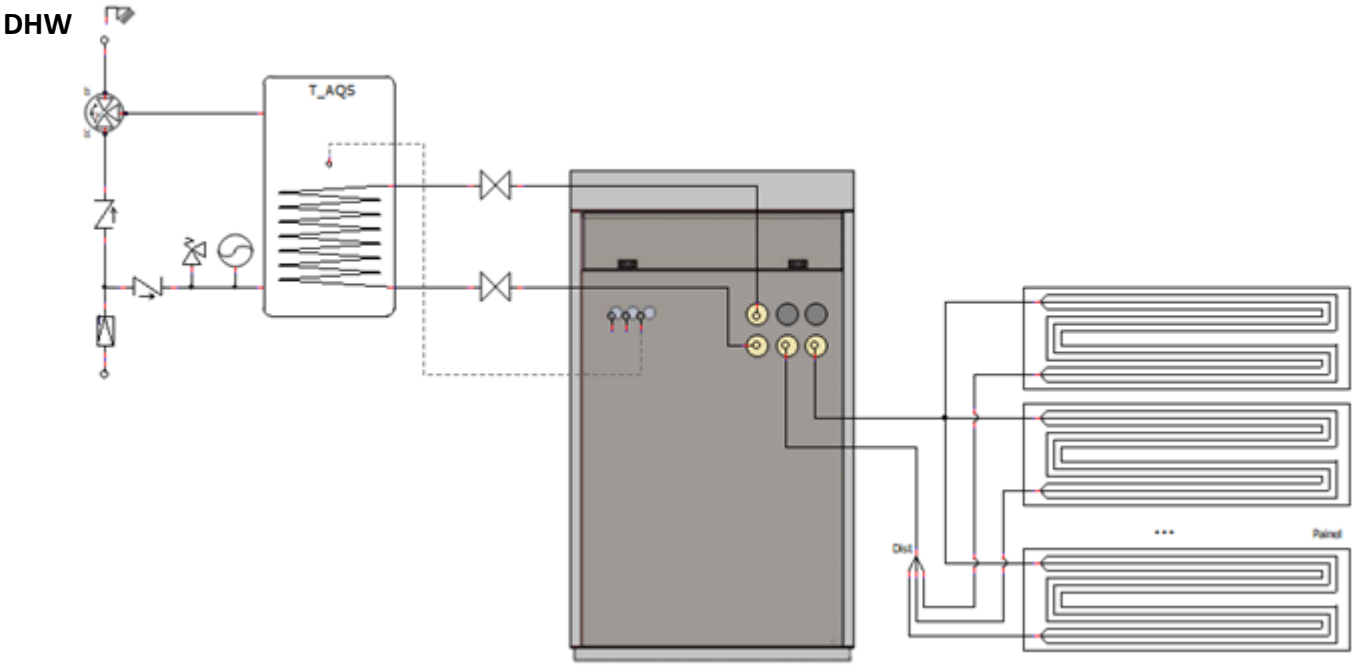
It is mandatory to use anticorrosive fluid (stabilising liquid) on the hydraulic circuit to prevent corrosion, clogging, electrolysis phenomenon and noises.

9.1. Hydraulic connection BS ULTRA – Central Heating

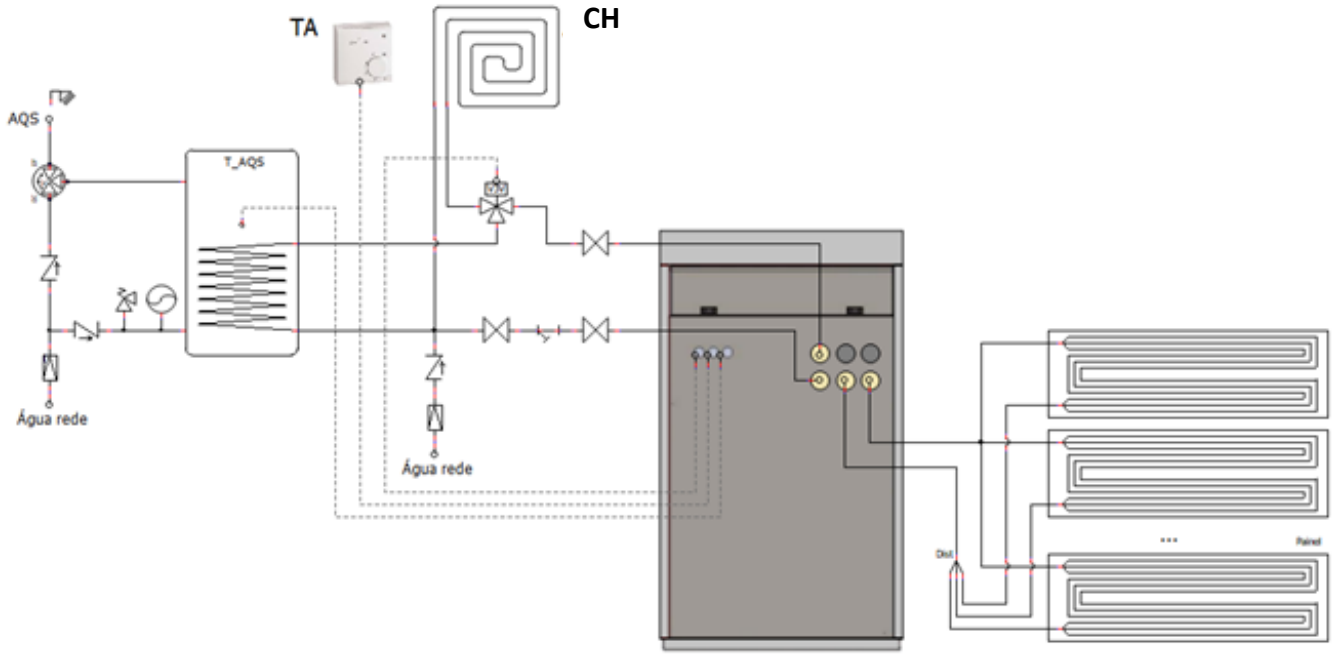


9.2. Hydraulic connection BS ULTRA – DHW

It is recommended to install a thermostatic mixing valve in the DHW circuit according to the following diagram

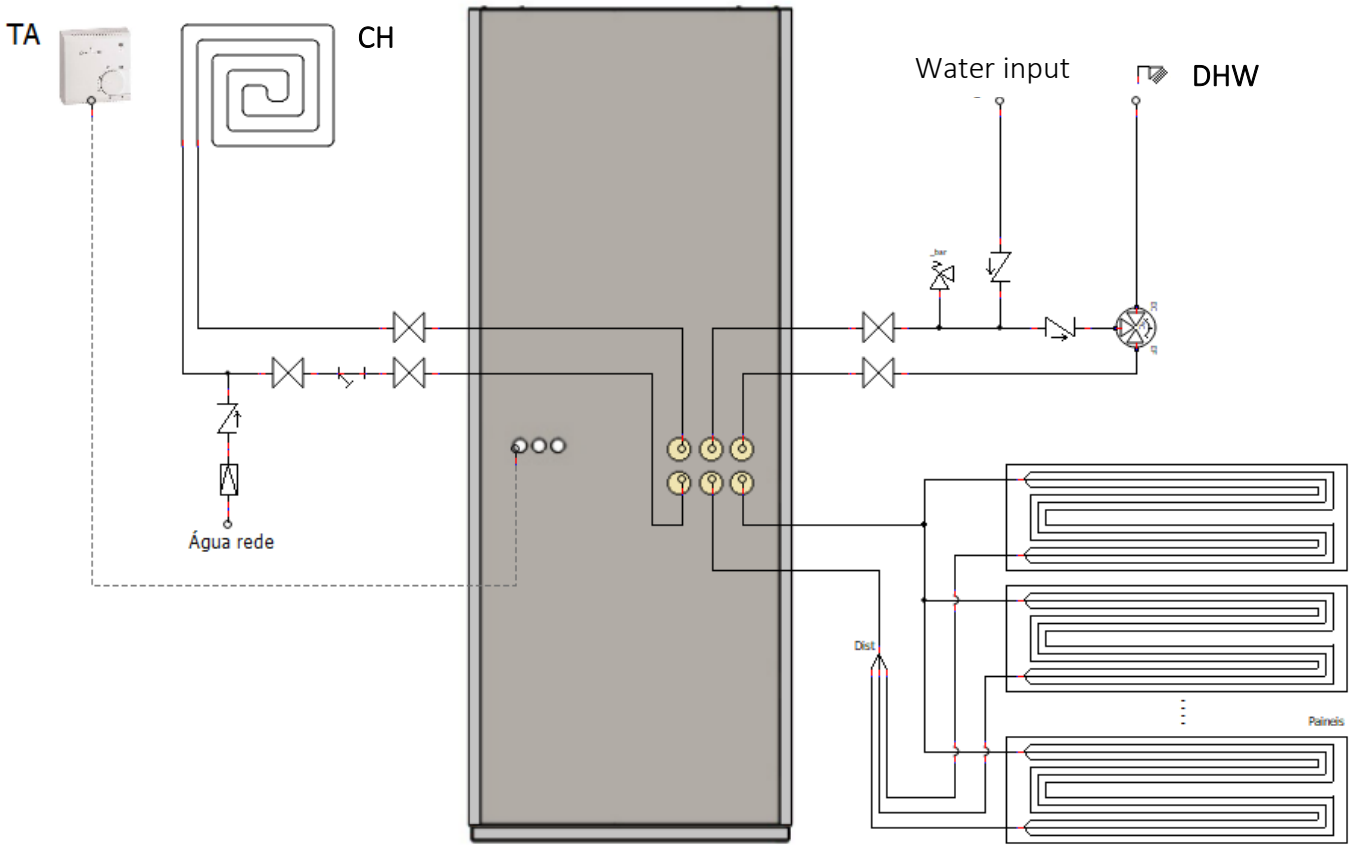


9.3. Hydraulic connection BS ULTRA – CH+DHW



9.4. Hydraulic connection BS ULTRA PLUS

It is recommended to install a thermostatic mixing valve in the DHW circuit according to the following diagram



	DHW output		Shut-off Valve
	Thermostatic Mixing Valve		Non-Return Valve
	Safety group		Filter
	Expansion vessel	V3V	3-Way Valve
TA	Ambient thermostat	CH	Central Heating
DHW	Domestic hot water		

These hydraulic drawings just show the core parts and main principle of the application.

6.6. Electrical connections

The electrical system must be installed by a professional who has preferably been qualified by ENERGIE.

Furthermore, it must be ensured that there is enough electrical current for the system in question which will have to meet the manufacturing characteristics as shown in the table below:

	Single phase (230V~ – 1F+N – 50/60Hz)	Three-phase (400V~ – 3F+N – 50/60Hz)
SB 6 ULTRA / PLUS	•	----
SB12 ULTRA / PLUS	•	•
SB 16 ULTRA	----	•
SB 32 ULTRA	----	•

The power supply to the Solar Block must be carried out directly from the general local distribution board, thereby avoiding the electrical powering from other points and/or equipment whose consumption may cause voltage drops with serious repercussions for equipment operation.

The electrical cable section must comply with the values shown in the table below. The maximum admissible losses for a cable of no more than 5 metres have already been considered in the calculations.

	Single phase (cable section mm^2)	Three-phase (cable section mm^2)
SB 6 ULTRA / PLUS	2,5	---
SB 12 ULTRA / PLUS	6	4
SB 16 ULTRA	----	4
SB 32 ULTRA	----	6

The circuit must also be protected from any possible current overloads and short circuits, foreseeing the installation of a magnetothermal switch with the following currents:

	Single phase	Three-phase
SB 6 ULTRA / PLUS	20A	----
SB 12 ULTRA / PLUS	32A	32A
SB 16 ULTRA	----	32A
SB 32 ULTRA	----	40A

The differential circuit breaker associated to the equipment must be <u>type A</u>. Otherwise, the leakage currents generated by the driver can activate the protection device.

Do not power the electrical compressor before carrying out all the refrigerant connections, ensuring that the circuit is loaded and that the hydraulic circuit is duly filled with water.

Under no circumstances should the equipment be put in operation without being duly connected to the earth circuit of the electrical installation

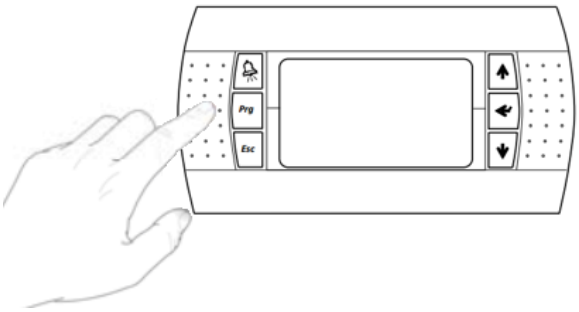
10. CONTROL PANEL

The control terminal is installed on the front of the machine.

The implemented control software guarantees an efficient equipment management and all the safety features of the machine.

Through the terminal you can monitor the operation of the unit and set the operating parameters such as setpoint, time setting, etc.

keyboard



The terminal, shown in the figure below, has six buttons, with the following functions:

	Alarm	Alarm Shows the list of active alarms and allows access to the alarm history;
	Menu	Menu Allows you to enter the function tree of the main menu;
	Esc	Esc Returns to top-level mask.
	Up	Up Scrolls up or increases the value displayed by the cursor;
	Enter	Enter Enters the selected submenu or confirms the set value;
	Down	Down Scrolls down or reduces the value displayed by the cursor;

The LED associated with the key has the following function:

LED	key	Description
Red		**Intermittent: Presence of active alarms**

Display description

There are three main types of pages shown to the user:

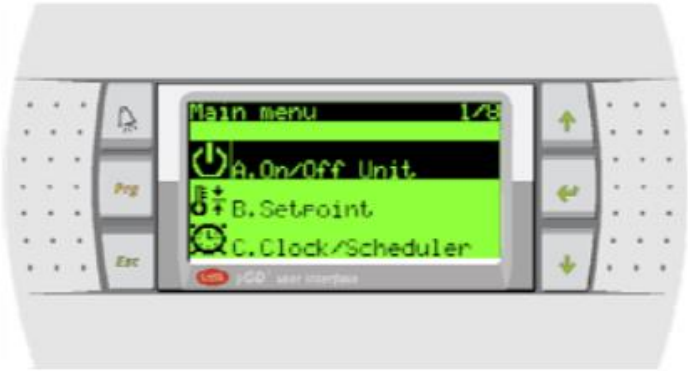
- Main page;
- Menu page;
- Viewing/parameter setting page.

The lines on the main display are arranged as follows:

1	Date, time and number of connected units,
2	2 Readings of major quantities and active orders;
	No requested orders (central heating or storage water heaters);
	Storage water heater order;
	Central Heating order;
3	Main active components;
	Compressor in operation;
	Storage water heater running;
	Active circulating pump,
4	Unit status: **1. OFF** (Equipment on OFF); **2. ON** (All functions are active. The unit adjusts the parameters according to the active operating mode.); **3. ENERGY SAVE.** (All functions are active. The unit sets the operating parameters to lower values.); **4. AUTO-OFF** (The unit is OFF according to the time settings); **5. AUTO-ON** (The unit is ON according to the time settings); **6. AUTO-E.S.** (The unit is ON according to the time settings and adopts the ENERGY SAVE mode parameters); **7. Din-OFF** (The unit is switched off via digital input. All functions remain inactive.); **8. BMS-OFF** (ON/OFF of the unit via BMS); **9. ALARM-OFF** (Unit is OFF due to an alarm.); **10. PROTECT** ((Active anti-ice function. Water temperature in the hydraulic circuit too low Twater ≤4

Main menu

The parameters are grouped by access type, initially the user, then the installer and finally the Manufacturer. Each user sees only the parameters and menu options available for their respective access level;

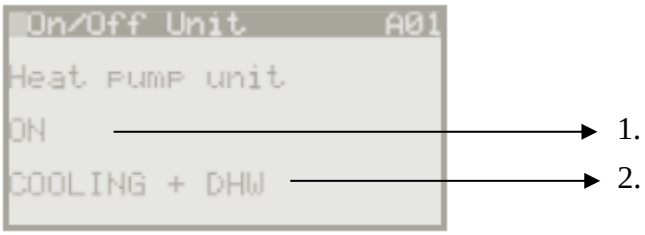


Main menu – function tree

- A. Unit state
  - ON / OFF / AUTO / ENERGY SAVE
  - DHW only / HEATING + DHW
- B. Setpoint
  - Nominal Setpoint
  - Energy save setpoint
- C. Timer
  - Time setting
- D. Input / Output
  - Status list of analog inputs
- E. Alarm
  - Alarm list
- F. System address;
- G. Service Menu
- H. Manufacturer menu

A. Unit state

The unit status can be set from Menu A based on the applicable selection.



1. The selected options can be:

- ON (unit operating under defined conditions);
- OFF (unit on standby);
- Energy Saving (unit in energy save mode);
- AUTO (unit in operation, but conditioned by the defined time setting)

The equipment control through the digital input functions as an enable, that is, if the digital input is switched off (OFF status) the equipment can not be switched on in any other mode.
If the digital input is active (ON status) the equipment can be switched on or off through the console.

2. The selected options can be:

- HEATING + DHW (central heating + domestic hot water);
- ONLY DHW (only domestic hot water)

B. Setpoint

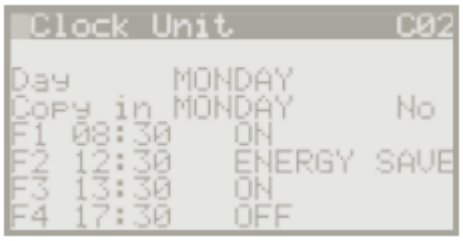
Used to define the setpoint of the equipment operation in cooling mode, heating mode, sanitary hot water and in energy save mode.
The following figures show only the information regarding the unit setpoint.

C. Timer (time setting)

The controller is equipped with an internal battery backup clock that stores the time and date for all associated functions. The time setting is defined from the following menus:

- **1st step (C01). Internal clock setting/adjustment;**

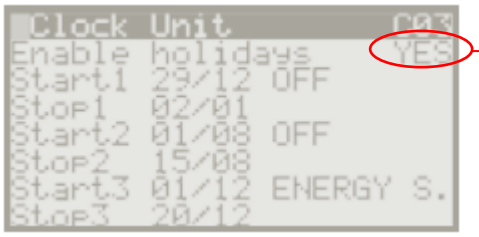
- **2nd step (C02). Time setting of equipment operating ranges.**



It is not necessary to program every day of the week, just program the first day and copy the schedule for the remaining days.
If you choose a different schedule, you should schedule it day by day.

- **3rd step (C03). Schedule for holidays.**

The function is only executed if it is active.



Enable holiday schedule

- **4th step (C04). Schedule for special/specific days.**

The function is only executed if it is active.

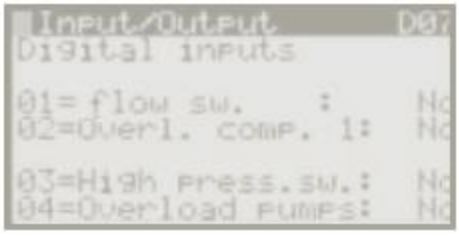
Enable schedule for special days.

It is not necessary to set all the time slots, simply leave the slot empty "-: -" in field "hh: mm".

Note: The time setting of the equipment is only effectively assumed if the equipment is in auto mode.
Note: The anti-ice protection is guaranteed on OFF mode.

D. Input / Output

In the main menu (D.) you can check the physical status of the digital and analog inputs and outputs.
If the input or output is not configured "----" will be displayed. The applicable menu is shown below:

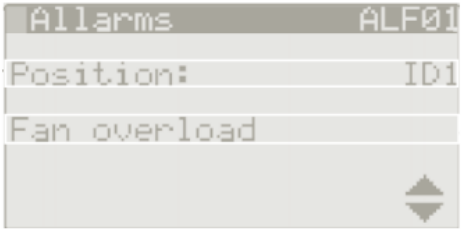


E. Alarm record

In the main menu (E.), entered alarms are displayed in chronological sequence.

To check the active alarms, simply press the key  and automatically enter the Error list. To scroll through the list of errors use the "up" and "down" keys.

The alarm reset can be done by pressing the key  for a few seconds, if the alarm persists and the alarm message reappears because the alarm error has not been solved.



F.  Network equipment address (pLAN);

O menu principal (F.), tem apenas um menu que mostra os equipamentos na rede pLAN. Cada equipamento é seguido do seu endereço na rede, por exemplo, uPC board: 1.

The main menu (F.) has only one menu that shows the equipment in the pLAN network. Each device is followed by its network address, for example, uPC board: 1.

G.  Service

The main menu (G.) is divided into two parts, the first (a, b, c) without password protection and is used to configure or check the following data:

G.a Language settings: available only in English;

G.b. Information: in the first menu, information is provided regarding the application code and corresponding version and in the second menu, information about the uPC and board hardware is presented;

G.d. Operating hours: displays the operating hours of the main devices (compressor and circulating pumps) that may require periodic maintenance;

The other menus can only be accessed by the manufacturer and have password protection.

H.  Manufacturer

In the main menu (H.), menus can only be accessed by the manufacturer and have password protection.

11. ALARM

The active alarms on the device are signalled by the luminous indication on the key  of the graphical interface.

To access the alarm list press the Key  . . If there is more than one active alarm, use keys ↓ or ↑ to scroll the alarm list.

Alarm	Description	Reset	Action
ALA03	Storage water heater control probe off or damaged;	Automatic	Interruption of the storage water heater circuit management. Check probe.
ALA04	Input (AC) temperature probe disconnected or damaged;	Automatic	Equipment on safe mode (OFF). Check probe.
ALA06	External temperature probe off or damaged;	Automatic	Interruption of functions related to the external probe. Check probe
ALA07	Output (AC) temperature probe off or damaged;	Automatic	Equipment on safe mode (OFF). Check probe
ALA08	Storage water heater temperature probe off or damaged;	Automatic	Interruption of the storage water heater circuit management. Check probe
ALA09	Compressor discharge temperature off or damaged;	Automatic	Equipment on safe mode (OFF). Check probe
ALA10	Suction temperature probe off or damaged;	Automatic	Equipment on safe mode (OFF). Check probe
ALA11	High pressure transducer off or damaged;	Automatic	Equipment on safe mode (OFF). Check transducer.
ALA12	Low pressure transducer off or damaged;	Automatic	Equipment on safe mode (OFF). Check transducer.
ALB01	High Pressure switch active, disconnected or damaged;	Manual	Equipment on safe mode (OFF). Check pressure switch.
ALB02	Active HP alarm from high pressure transducer;	Manual	Equipment on safe mode (OFF). Check pressure on circuit.
ALB03	Active LP alarm from low pressure transducer;	Manual	Equipment on safe mode (OFF). Check pressure on circuit.
ALC1	Compressor thermal system or inverter alarm;	Manual	Equipment on safe mode (OFF). Check thermal system or driver.
ALC3	Alarm triggered when the compressor is out of the working range;	Manual	Equipment on safe mode (OFF)
ALC4	Compressor start failure	Automatic	Equipment on safe mode (OFF)

ALP02	Circulating pump thermal system	Automatic	Equipment on safe mode (OFF). Check that pump is not jammed or airtight.
ALP03	Flow switch	Automatic	Equipment on safe mode (OFF). Check that the device is completely filled, without air bubbles and with the clean filter.
ALT01	Limit of working hours reached by the compressor.	Manual	Warning. Delete warning to restart timer.
ALT04 ALT05	Limit of working hours reached by the circulator pump.	Manual	Warning. Delete warning to restart timer.
ALU02	Condenser anti-freeze protection.	Manual	Equipment on safe mode (OFF). Check circulating pump.
ALW01	Storage water heater temperature alarm	Manual	Warning. Check the temperature probe.
ALD01	EEPROM Error	Manual	Equipment on safe mode (OFF). Check controller battery.
ALD03	VEE engine failure	Manual	Equipment on safe mode (OFF). Check VEE connection cable.
ALD04	Low overheating	Manual	Equipment on safe mode (OFF). Check if there is no obstruction in the air circulation in the external unit.
ALD05	Low suction temperature	Manual	Equipment on safe mode (OFF). Check probe status/connection (NTC10kΩ@25°C)
ALD06	Low evaporation temperature (LOP)	Manual	Equipment on safe mode (OFF). Check status/connection of the suction transducer.
ALD07	High evaporation temperature (MOP)	Manual	Equipment on safe mode (OFF). Check status/connection of the suction transducer.
ALD08	High condensation temperature (HiTcond)	Manual	Equipment on safe mode (OFF). Check status/connection of the high pressure transducer.
ALD09	Drive offline	Automatic	Equipment on safe mode (OFF). Check communication between the control board and drive.
ALL02	Alarms Power+ n°1 (drive) 0: No fault 1: Overcurrent 2: Motor overload 3: Overvoltage 4: Undervoltage 5: Drive overT. 6: Drive underT 7: Overcurrent HW 8: Motor overtemp. 9: Reserved 10: Cpu error	Manual	Equipment on safe mode (OFF). Check pressure in the cooling circuit. Check connections or status of the low pressure switch. Contact manufacturer.

	11: Param. default 12: DC bus ripple 13: Data comms fault 14: Drive thermistor 15: Autotune fault 16: Drive disabled 17: Motor phase 18: Fan fault 19: Speed fault		

12. GUARANTEE

This warranty covers all defects to the confirmed materials, excluding the payment of any type of personal damage indemnity caused directly or indirectly by the materials.
The periods indicated below start from the purchase date of the apparatus, 6 months at the latest from the leaving date from our storage warehouses.

Component	**Guarantee period**
Water Cylinder (domestic and industrial use)	5 Years: • Stainless Steel (2 + 3 years)* 5 Years: • Enamelled (2 + 3 years)*
Thermodynamic solar panel	10 Years (Against Production Defects and corrosion)
Electrical components and Moving parts:	2 Years

*The warranty extension of 3 years, against corrosion of the internal tank (Enamelled / Stainless Steel), is conditioned to the submission of:

- Warranty and Check Sheet at maximum 15 days after the installation;
- Documental evidence of the magnesium anode replacement;
- Pictures of the installation where it's shown safety group, expansion vessel, hydraulic and electrical connections.

In case of warranty, the parts replaced are property of the manufacturer.
A repair under the warranty is not reason for an extension of its term.

Warranty Exclusions

The warranty ceases to be effective when the apparatus is no longer connected, used or assembled in accordance with manufacturer instructions, or if there has been any form of intervention by unauthorized technicians, has the appearance of modifications and/or if the series number appears to have been removed or erased. The equipment should be installed by qualified technicians according to the rules in effects and/or the rules of the trade, or the instructions of our technical services. Further exclusions from warranty:

- Hot water tanks have been operating in water with the following indexes:
  - Active chlorine > 0.2 ppm;
  - Chlorides > 50 mg/l (Inox);
  - Hardness > 200 mg/l;
  - Condutibility > 600 µS/cm (20 ºC);
  - PH < 5,5 or PH > 9 (Sorensen at 20ºC);
  - If one of the water parameters has a greater value than stipulated by directive 236/98 (Portugal) or equivalent standard in the costumer's country.
- Parts are subject to natural wear and tear – levers, switches, resistances, programmers, thermostats, etc.;
- Breakdown due to incorrect handling, electrical discharges, flooding, humidity or by improper use of the apparatus;
- The warranty lapses if it is transferred to another owner, even if within the guarantee period;

- The warranty lapses if this certificate is incorrectly filled in, if it is violated or if it is returned after more than 15 days have passed since the purchase date of the apparatus.

ATTENTION: Technical assistance costs even within the warranty period shall be supported by the customer (Km and assistance time). In cases where there is no justifiable breakdown and subsequent need for technical assistance, the client will pay for lost technical assistance time.

NOTE