Installer Manual

Bunsen Air

Solar Assisted Heat pump

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1 Important information

This manual is intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation. This appliance must only be installed by a qualified person who is certified and trained to operate solar assisted heat pump system.

After receiving Bunsen Air, please inspect the state of the system to ensure components are not damaged. Any damage related to transport is the responsibility of the purchaser's shipping company and should be promptly addressed.

The Bunsen Air must be used only indoors in applications for which it was intended. Any misuse of this unit can cause personal injury and/or damage to equipment.

Modifications of any electrical connections in the Bunsen Air solar assisted heat pump system may cause the warranty to become void. Homes with unstable power require protection devices to manage Brown Power or voltage spikes. Consult with your Electrician for advice.

Please note that Solamics, as the manufacturer, decline any responsibilities as regards damages deriving from an incorrect installation and a failure to follow the instructions detailed in the document. Any damage caused or mal-function of systems, which do not comply with this manual and any deviation from this manual will invalidate the guarantee.

Marking

Bunsen Air is CE marked.

The CE marking means that Solamics ensures that the product meets all regulations that are placed on it based on relevant EU directives. The CE mark is obligatory for most products sold in the EU, regardless where they are made.

Symbols

Caution

This symbol indicates important information about what you should observe when maintaining your installation.

Warning

This symbol indicates danger to machine or person.

Note

This symbol indicates tips on how to facilitate using the product.

GB

Disposal

Leave the disposal of the packaging to the installer who installed the product or to special waste stations.

Do not dispose of used products with normal household waste. It must be disposed of at a special waste station or dealer who provides this type of service.

Improper disposal of the product by the user results in administrative penalties in accordance with current legislation.

Safety information

Before install the unit, make sure you read all the “Safety precautions”.
Please report to your supply authority or obtain their consent before connecting this equipment to the power supply system.

After installation, perform the test run to ensure normal operation. Then explain your customer the “Safety Precautions”, use, and maintenance of the unit based on the information in the Operation Manual provided by local application manufacture.
Both the Installer Manual and the Operation Manual must be given to the user. These manuals must always be kept by the actual users.

⚠ Warning:

- The unit must not be installed by the user. Ask an installer or an authorized technician to install the unit. If the unit is installed improperly, electric shock, or fire may be caused.
- For installation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with refrigerant specified in the outdoor unit installation manual.
- The unit must be installed according to the instructions in order to minimize the risk of damages by earthquakes, typhoons, or strong winds. Improperly installed unit may fall down and cause damages or injuries.
- The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damages or injuries.
- All electric work must be performed by a qualified technician according to local regulations and the instructions given in this manual. The unit must be powered by dedicated power lines and the correct voltage and circuit breakers must be used. Power lines with insufficient capacity or incorrect electrical work may result in electric shock or fire.
- Only the specified cables can be used for wiring. Connections must be made securely without tension on the terminals. If cables are connected or installed improperly, it may result in overheating or fire.
- Terminal block cover panel of the unit must be firmly fixed. If the cover panel is mounted improperly, dust and moisture may enter the unit, and it may cause electric shock or fire.
- Make sure to use accessories authorized by Solamics and ask an installer or an authorized technician to install them. If accessories are improperly installed, it may cause electric shock, or fire.
- Do not remodel the unit. Consult an installer for repairs. If alternations or repairs are not performed correctly, it may cause electric shock or fire.
- The user should never attempt to repair the unit or transfer it to another location. If the unit is installed improperly, it may cause electric shock or fire. If the unit needs to be repaired or moved, ask an installer or an authorized technician.

1.1 Before installation (Environment)

❗ Caution:

- Do not install the Bunsen Air unit in outdoor location as it is designed for indoor installation only. Otherwise electric shock or breakdown may be caused by water drop, wind or dust.
- Do not use the unit in an unusual environment. If the Bunsen Air unit is installed or exposed to steam, volatile oil (including machine oil), or sulfuric gas, or exposed to briny air, the internal parts can be damaged.
- Do not install the unit where combustible gases may leak, be producted, flow, or accumulate. If combustible gas accumulates around the unit, it may cause fire or explosion.
- When installing the unit in a hospital or in a building where communications equipment are installed, you may need to take measure to noise and electronic interference. Inverters, home appliances, high-frequency medical equipment, and radio communications equipment can cause the Bunsen Air unit to malfunction or to breakdown. At the same time, the noise and electric interference from the Bunsen Air unit may disturb the proper operation of medical equipment, and communications equipment.

1.2 Before installation or relocation

❗ Caution:

- Be fully careful when moving the units. Do not hold the packaging bands. Wear protective gloves to unpack and to move it, in order to avoid your hands be injured by parts.
- Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause injuries.
- Do not wash the Bunsen Air unit. You may receive an electric shock.

1.3 Before electric work

❗ Caution:

- Be sure to install a circuit breaker. If it is not installed, there may be a risk to get an electric shock.
- For the power lines, use standard cables of sufficient capacity. Otherwise, it may cause a short circuit, overheating, or fire.
- When installing the power lines, do not apply tension to the cables. The cables may be cut or overheated resulting in a fire.
- Make sure to ground the unit. Do not connect the ground wire to gas or water pipes, lightning rods, or telephone grounding lines. If the unit is not properly grounded, there may be a risk to get an electric shock.
- Make sure to use circuit breakers (ground fault interrupter, isolating switch (+B fuse), and molded case circuit breaker) with the specified capacity. If the circuit breaker capacity is larger than the specified capacity, breakdown or fire may result.

1.4 Before starting the test run

❗ Caution:

- Before starting operation, check that all protective parts are correctly installed. Make sure not to get injured by touching high voltage parts.
- Do not touch any switch with wet hands. There may be a risk to get an electric shock.
- After stopping operation, make sure to wait at least 5 minutes before turning off the main power. Otherwise, it may cause breakdown.

2 Introduction

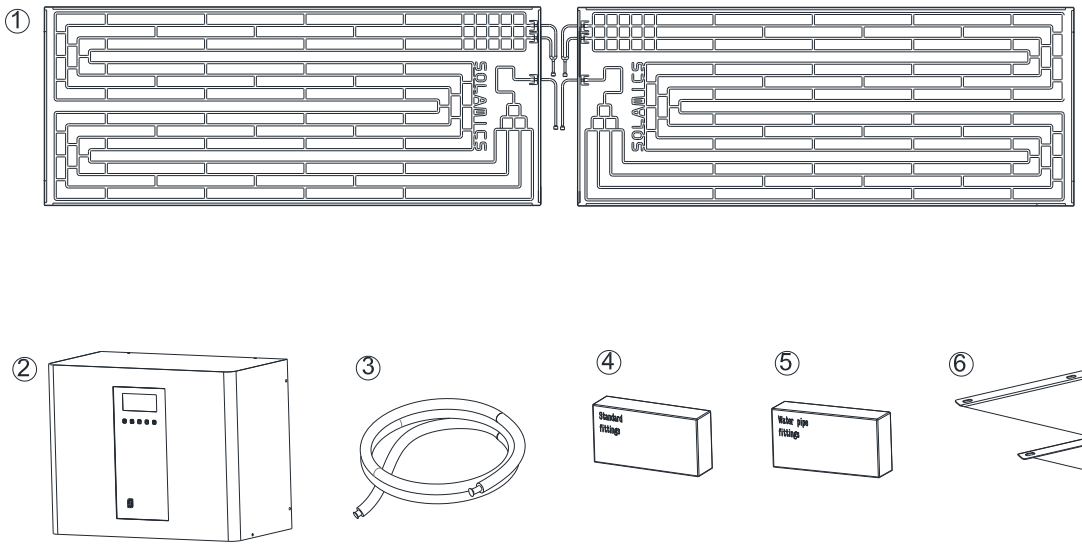
The Bunsen Air is Solar Assisted Heat Pump designed to transfer energy from the free natural elements into hot water for domestic properties. The unit will retro-fit to existing cylinders, or newly introduced cylinders, and turn that cylinder into a heat store for renewable water heating.

The system is designed to heat the hot water with the standard cylinder of 200 Lites up to 53°C at all time, and up to 60°C once a week for anti-legionella. The unit is set to a default (can be adjusted) temperature of 53°C, when the temperature of the cylinder drops by 5°C the system will automatically switch on to raise the temperature back to the required set temperature.

In addition there is an Energy Saving mode which will allow 3 time periods to be set up with 3 different target temperatures for use with a time zone setting or under automatic mode.

The Bunsen Air has all the benefits of standard heat pump technology, based on low level power usage running for longer periods to generate low energy renewable heating of hot water.

Bunsen Air Components



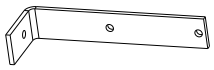
Key Components
1. Bunsen Panels
2. Bunsen Controller
3. Refrigeration Pipe
4. Standard Fitting
5. Water Fitting
6. Triangular Mounting Brackets

3 Supplied Components

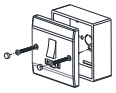
Location

The kit of supplied items in Standard Fittings is placed inside the box of Bunsen panel.

Standard Fittings



L - Brackets x 12



Fused Spur 13A &

Socket Box x 1

Panel installation

Philips Self-tapping Screws x 12

Philips Hex Head Screws x 12

Light Duty Finned Anchors x 12

Flange Nuts x 12

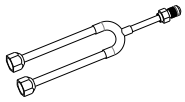
Unit installation

Philips Self-tapping Screws x 4

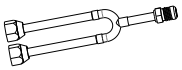
Philips Hex Head Screws x 4

Light Duty Finned Anchors x 4

Anti-vibration mounts x 4

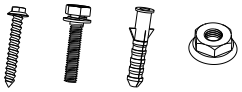


1/4” Inlet Line Connection x 1



3/8” Outlet Line Connection x 1

Spares



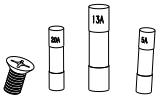
Philips Self-tapping Screws x 2

Philips Hex Head Screws x 2

Light Duty Finned Anchors x 4

Flange Nuts x 2

Spares



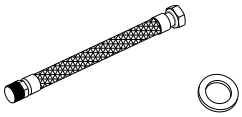
Fuse 20A x 1

Fuse 5A x 1

Fuse 13A x 1

Screw x 4

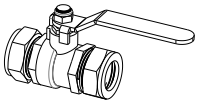
Water Fittings - Accessories



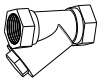
3/4" M22*300mm

Flexible Hoses x 2

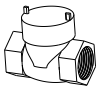
Hydraulic Seal x 2



Ball Valves x 2

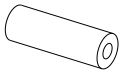


Brass Inline Y Filter x 1

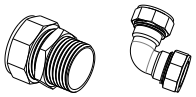


3/4 Non-return Valve x 1

9.52mm * 250mm long thin Pipe x 1

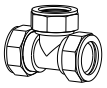


22mm/10mm * 65mm Adapter x 1



3/4” 22mm Brass Fittings x 6

22mm Elbow x 1



22mm Equal Tee x 1

Note

The kit of Water Fittings is used for hydraulic connection. If you require water fittings for the connection between Bunsen Air and cylinder, please contact your Sale Engineer.

There is a number of ways for hydraulic connection according to your cylinder. Please seek advice for your professional installer.

Always take a solid back board in case the proposed fixing points are not strong enough or crumble.

4 Bunsen Air Controller Specifications

Bunsen Air

Solar Assisted Heat Pump

Casing:	Cold rolled steel
Chassis Base:	Galvanized steel
Water Pipe-work Connections:	3/4 inch
Compressor:	Sealed hermetically and covered with a layer of insulation to prevent heat loss and absorb unnecessary vibrations
Refrigerant:	R134a- Tetra-fluoro-ethane, global warming potential (GWP) 1430
Condenser:	High performance steel shell & tube heat exchanger
Water Pump:	Dynamic conversion circulation pump

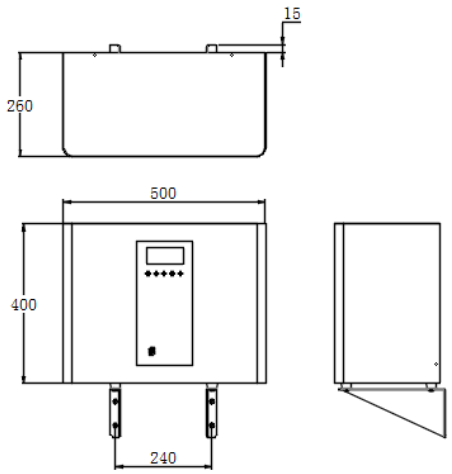
Compact design with low noise level, suitable for indoor installations

Performance	**Unit**	
Rated Power Output	w	400
Max. Duel Panel Thermal	w	2690
Performance Output		
Water Temperature	°C	53 (default setting, maximum temperature 60°C)
Dimensions and Weight		
Casing	mm	1.2
Chassis Base	mm	1.5
Height	mm	400
Width	mm	500
Depth	mm	260
Weight	kg	39
IP Number	-	IP 21
Connections		
Water inlet	inch	3/4
Water outlet	Inch	3/4
Refrigerant inlet	Inch	3/8
Refrigerant outlet	Inch	¼
Power supply	V / Hz	220 - 240 / 50
Specifications		
Operating current (Max.)	A	5
Operating Temperature	°C	- 8 to +40
Refrigerant charge (R134a)	g	1400
Sound Level	dB(A)	Equal or less than 41
Max working pressure	Bar	(Water side) 8

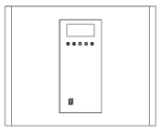
*Figure as per EN16147:2017, EU812/2013, ISO9806:2013

Bunsen Air Controller Dimensions

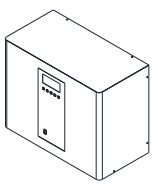
Dimensions



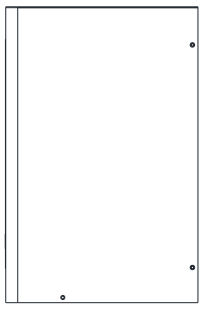
Front View



Isometric diagram



Side View



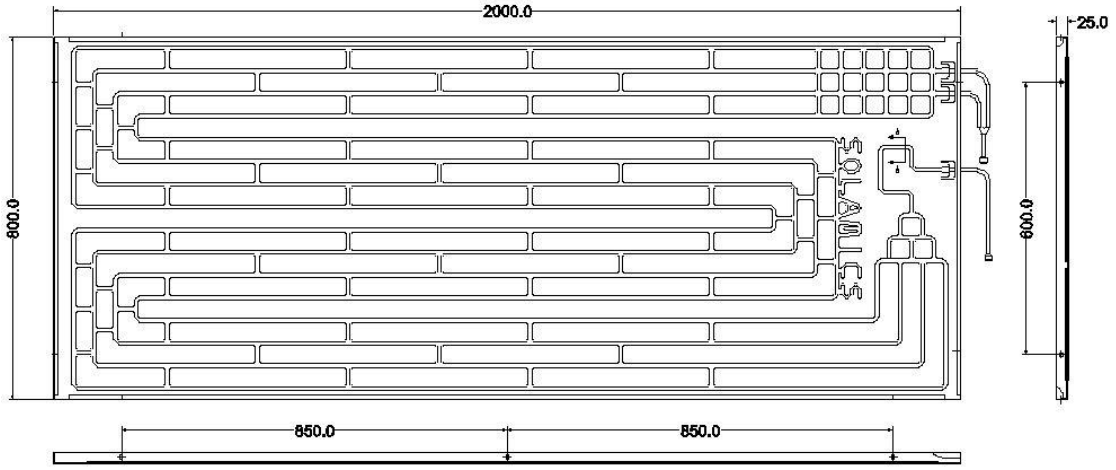
Bunsen Panel Specifications

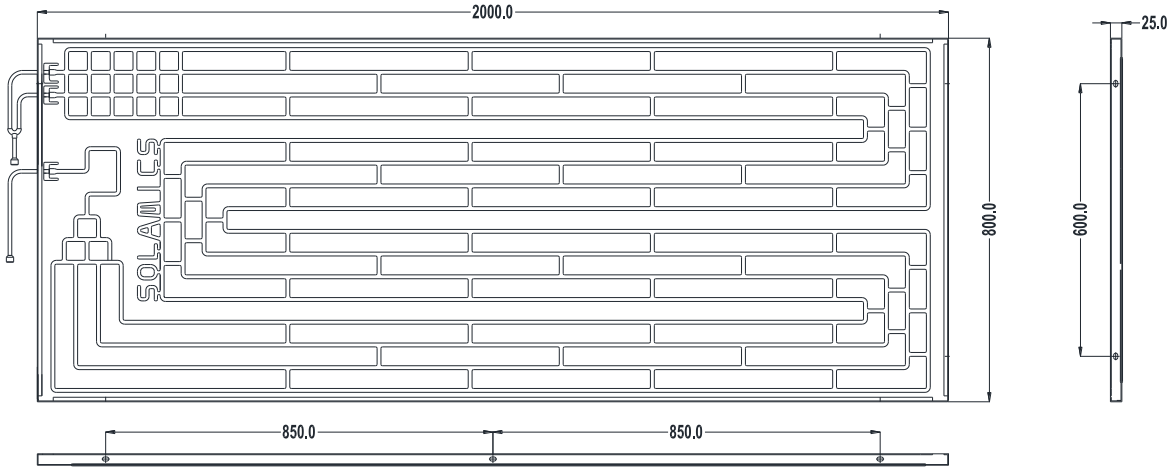
General

Finish:	Powder coated aluminium panel
Material Thickness:	2mm aluminium for increased mechanical strength
Protection:	Corrosion resistant and adaptability to all weathers
Fixing Orientation:	Can be installed in a landscape or portrait
Fixing Points:	Six fixing points per panel
Installation Angle:	Minimum of 10 degrees up to 80 degrees on vertical walls

** DO NOT LAY FLAT AS THIS WILL EFFECT THE FOLW OF R134a **

Dimensions and Weight	**Unit**	
Height	mm	2000 (+-2mm)
Width	mm	800 (+-2mm)
Frame Depth	mm	25
Weight	kg	8.9





5 Bunsen Air Installation

Selecting the Controller installation right location:

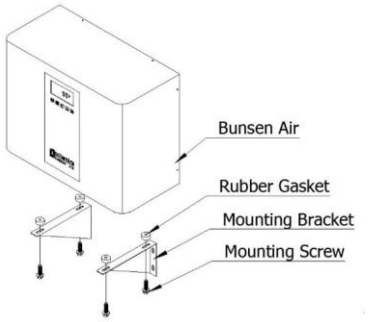
As part of any installation, a survey of the property should be carried out. It is important to locate the Controller as close to the cylinder as possible, and keeping the distance to the panels as short as possible.

Check with the Warranty conditions for factors to avoid when locating the Controller.

For installation, the Bunsen Air should be supplied with the following parts,

Component	Qty
Bunsen Air	1
Rubber Gasket	4
Mounting Bracket	2

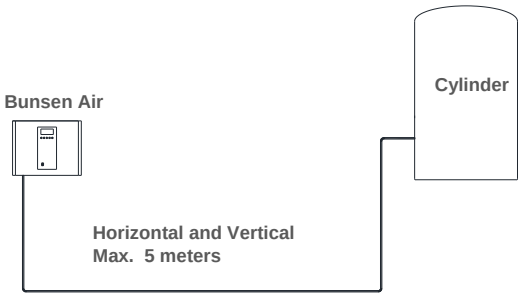
********Back Board – not provided but recommended********



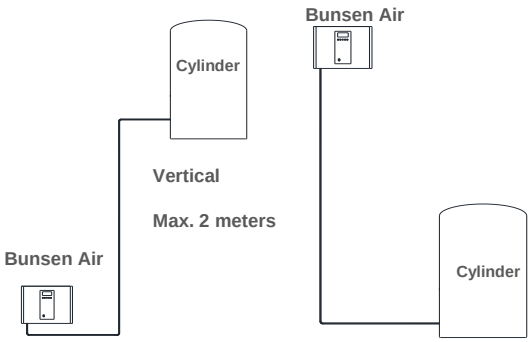
Choosing the Bunsen Air installation location

- Do not install the Bunsen Air in outdoor location as it is designed for indoor installation only. (It is not waterproof.)
- Avoid locations where the unit is exposed to direct sunlight or other sources of heat.
- Select a location where easy wiring access to the power souce is available.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Avoid areas with corrosive gases and strong electromagnetic waves.
- Select a location that can bear the weight and vibration of the unit.
- **Select a location where *the water pipe-run distance between Bunsen Air and water cylinder is as short as possible. The pipe-run distance is max. 5 meters with a max. vertical gain of 2 meters, amd a max. horizontal distance of 3 meters.***
- ***ALWAYS: Keep pipe runs to a minmum. The shorter the pipe-run the better the performance.***
- Must be installed in a level, horizontal position and sited on a solid, external wall where possible.

Horizontal Distance between Controller and Cylinder:



Vertical Distance between Controller and Cylinder:



Mounting the Controller

The Bunsen Air is wall-mounted using the brackets supplied. The Bunsen Air can also be positioned on a suitable flat surface close to the water cylinder.

Note:

Check that the mountings are located in their applicable grooves on the Bunsen Air.

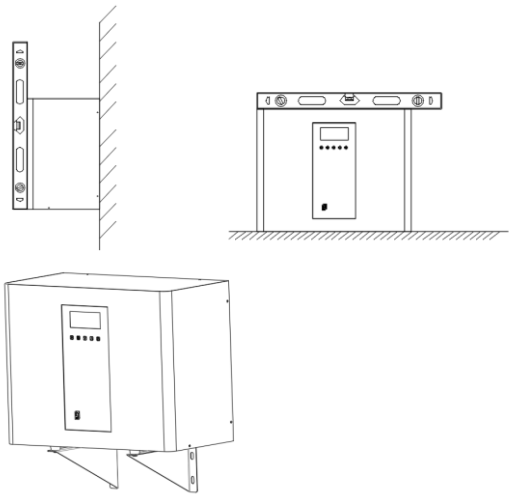
Ensure that the Bunsen Air is installed horizontally.

Component	Qty
Bunsen Air	1
Anti-vibration mounts	4
Mounting Brackets	2
Tapping Screws	8
Light Duty Finned Anchors	4
Hex Head Screws	4

Installing on brackets

1. Install Bunsen Air on brackets.

2. Connect water and refrigerate pipes.

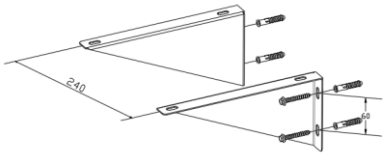


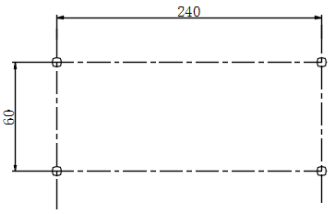
Installing brackets

1. Drill holes in the wall as illustrated.

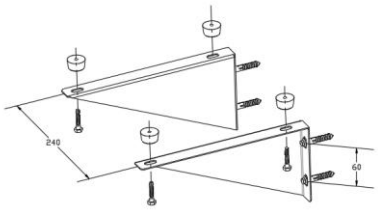
2. Fit the brackets on the wall with the distance of 240mm by screws and anchors.

3. Install the triangular mounting brackets together using the screws supplied.





4. Screw Bunsen Air into place on the brackets by using the Anti-vibration mounts, screws and nuts supplied.



Note

The standard pipe-run distance between Bunsen Air and Bunsen panel is 10 meters.

The Bunsen Air should be installed horizontally.

Make sure anti-vibration mount is in shape after installation.

6 Hydraulic Connections

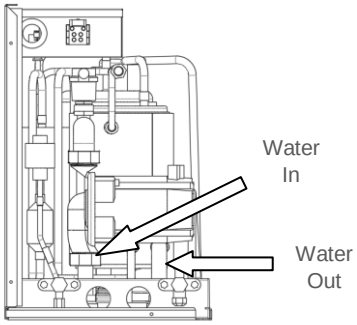
The water used may contain impurities and / or substances which are harmful to the system and health. Check the water being used is of an acceptable quality for domestic consumption. EU directive 98/83 EC shall be referred.

Meanwhile, there is a number of ways for hydraulic connections between Bunsen Air and cylinder.

Before Installation

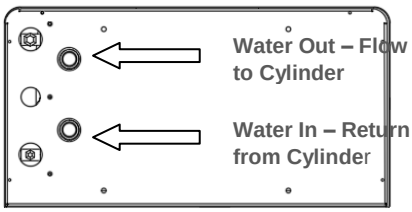
Water In & Out Position

Water in and water out shall be found at the bottom of the Bunsen Air, which are used to connect the water pipes.



Water Pipes for Connection

22mm Copper pipe shall be used for all water connections. All water pipes connection between Bunsen Air and cylinder shall be insulated. Good insulation will directly affect the performance of the system.

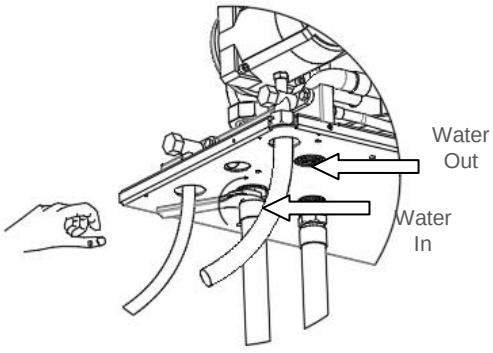


Cylinder

The insulation of cylinder will directly affect the performance of the system. The user has to make sure the functionality of the cylinder.

It is recommended that the cylinder shall have a standing heat loss level at 1.4kw per day or inside coil of 3 m^2 of surface area for heat exchange or according to the local standard.

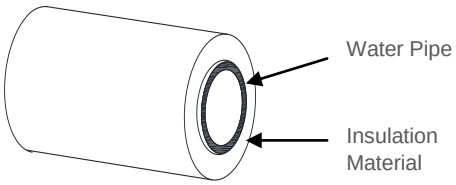
For Bunsen Air system, it is recommended to connect to a maximum cylinder volume of 200 litres. Cylinder more than 200 lites will directly affect the time of heating and performance.



Insulation for All Water Pipe

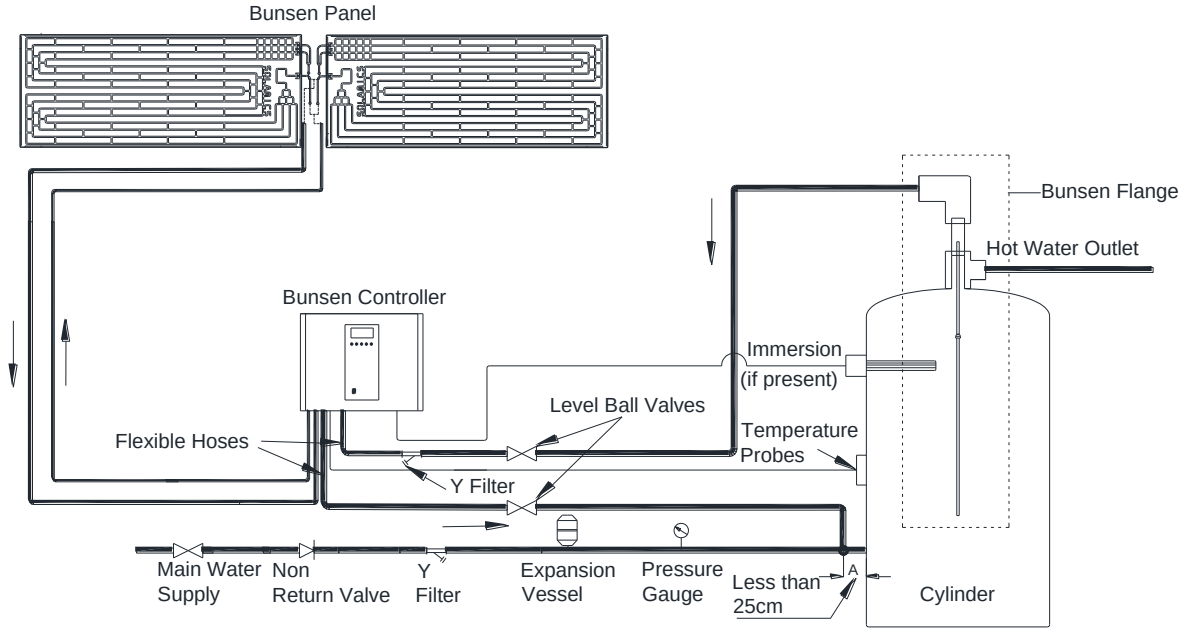
Note – Insulation

In between Bunsen controller and water cylinder, all water pipes must be covered by the insulation material to reduce heat loss. This directly affects the performance of system.

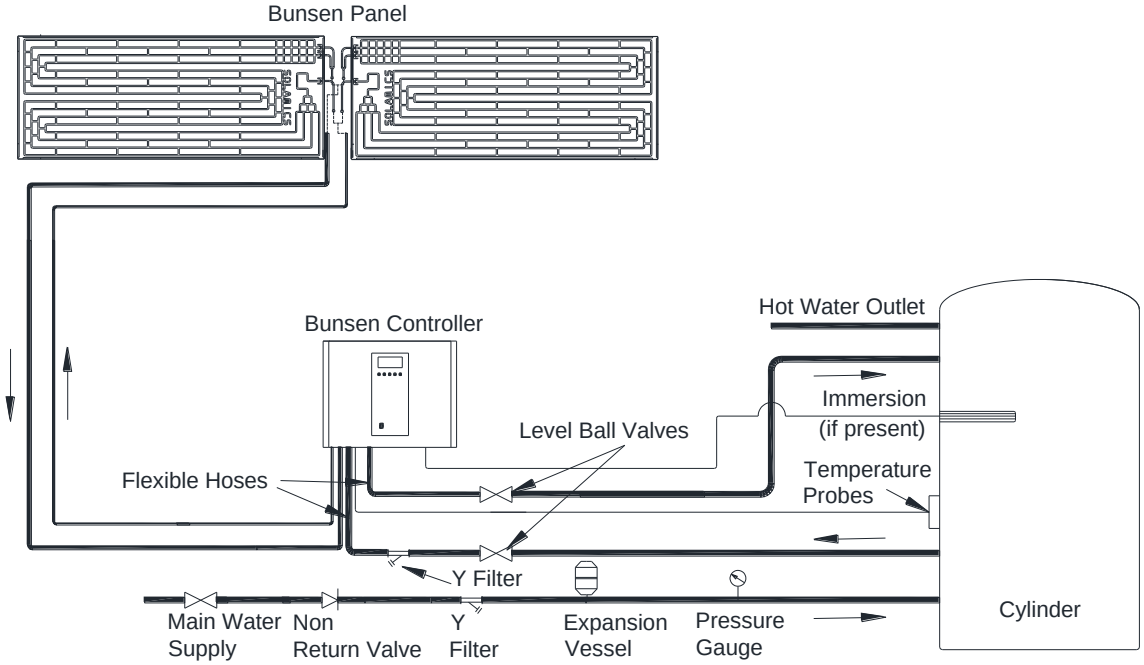


Unvented System Installation

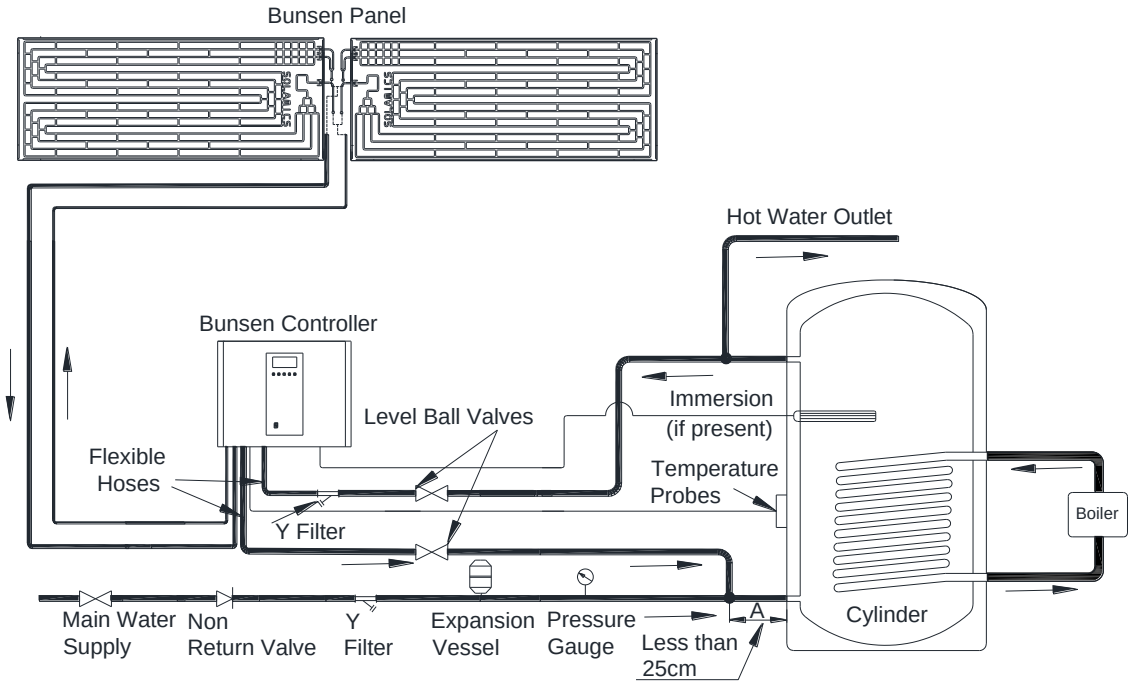
Water from the top of cylinder



Water from the side of cylinder

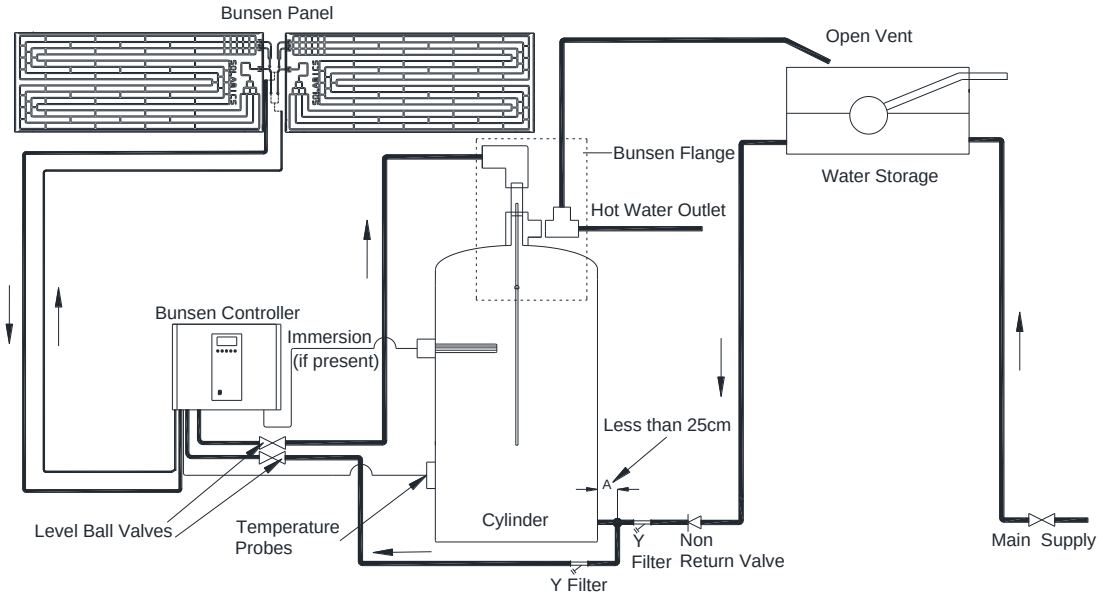


Water from the cylinder with internal coil



Vented System Installation

Water from the top of cylinder



System Description

Description

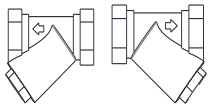
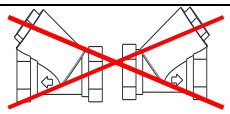
Water inlet and outlet connections of the cylinder shall be connected according to the vented and unvented system diagrams.

The size of the hole of water inlet and outlet is 3/4".

To prevent unnecessary of heat loss, the length between the point A (shown in the system diagram) and cylinder in the connection shall be less than 25cm.

For the vented system, it is very important to keep the bottom of water storage tank at least 1 meter higher than both the top of Bunsen controller and water cylinder.

For hydraulic connection between Bunsen Air and cylinder, please ask your professional installer, who shall install based on your actual situation.

Correct Position for Y-filter Installation	Wrong Position for Y-filter Installation
	

Note

The Bunsen Air shall be positioned as close to the water cylinder as possible so that to minimize any forms of unnecessary energy loss.

Keep bends and turns in the connections as less as possible.

A check valve shall be installed horizontally between the water storage tank and the cylinder, which is to ensure that the water pressure is sufficient to open the valve; otherwise air shall be drawn into the system. Please seek advice from your water cylinder installer.

Drain cock shall be installed at the lowest part of the system for draining the system.

Caution

The inline Y-filter shall be installed horizontally to defer any dirt, debris, or impurities to flow into the condenser in Bunsen Air, according to the diagram. This directly affects the system's functionality. *The guarantee will be invalid due to failure of installation.*

Bunsen Flange Assembly

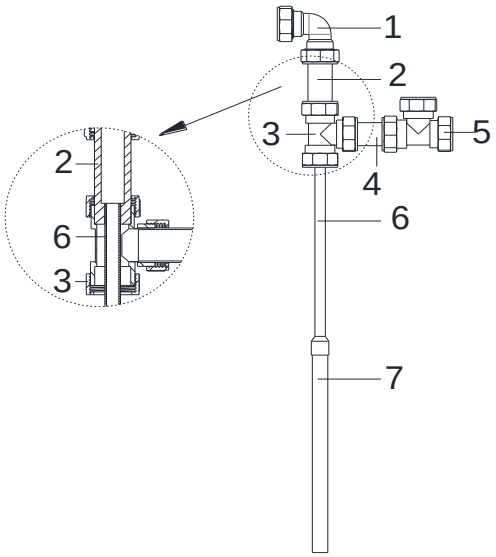
All components shall be bought and assembled from and by your professional installers. It is not included in the components of Bunsen Air.

Key Components of Bunsen Flange

1. 22mm Elbow
2. 22mm/10mm * 65mm Adapter
3. 22 mm equal tee
4. 22mm diameter copper pipe
5. 22 mm equal tee
6. 52mm *240mm long thin pipe
7. Additional copper tube (required or not, based on deep length of your cylinder)

Important Remark:

The Copper tube No.7 should be cut to a length to reach 2/3rds down the cylinder length (1/3 from the bottom).



Temperature Probe Installation

THE TEMPERATURE PROBE MUST BE INSTERTED INTO THE PROBE POCKET, OR DRY POCKET OF THE CYLINDER.

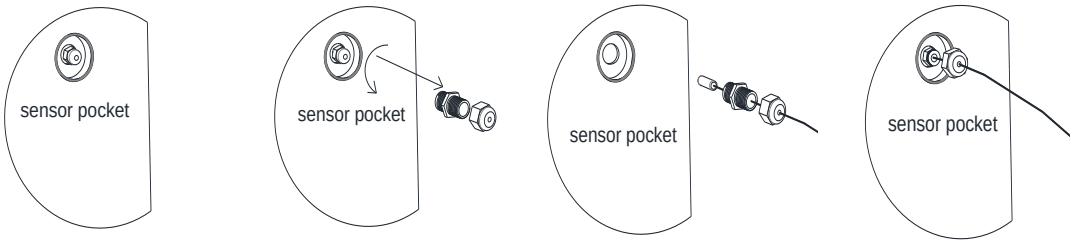
The temperature probe is used to monitor the temperature of the cylinder. The probe cable can extend to the length of 10 meters.

If there is no pocket available to use, it shall be attached 1/3rd position from the bottom of cylinder.

To ensure a reliable and solid contact between the probe and cylinder side, thermal paste should be used.

Note

To make sure the reliable and solid contact between the probe and cylinder side, the thermal paste shall be used.



Steps

1. Locate the position of sensor pocket on the cylinder.

2. Remove the sensor pocket cover.

3. Pass the temperature probe through the cover.

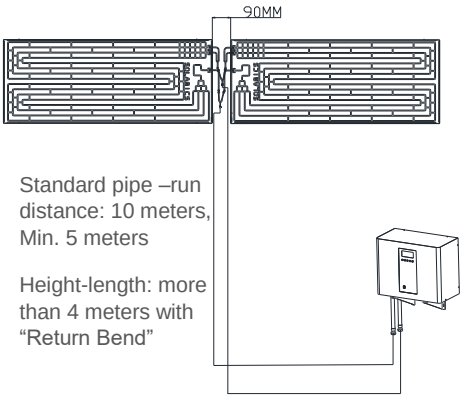
4. Push the temperature probe as far as possible into the cylinder pocket, and then tighten the cover.

7 Bunsen Panel Installation

Position between Bunsen Panel and Bunsen Controller

Choosing the Bunsen Panel location

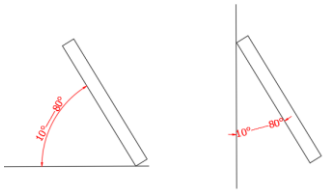
- Select a location where ***the standard pipe-run distance between Bunsen Air and Bunsen panel is 10 meters,*** and minimum is not less than 5 meters. ***If the pipe-run height length is more than 4 meters, please install "Return Bend" on the pipe.***
- ***ALWAYS: The shorter the pipe-run distance, the better the performance.***



External Panel Installation

The location and the angle where the panels are installed must be considered carefully.

To the ground or on the wall, the panels should be set at an angle between 10°and 80°, preferably pointing south.

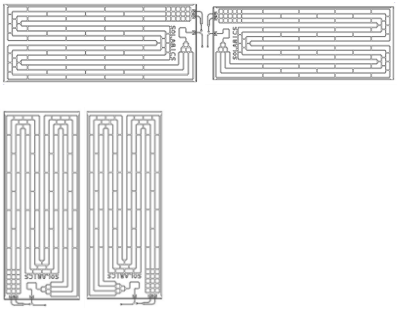


Note

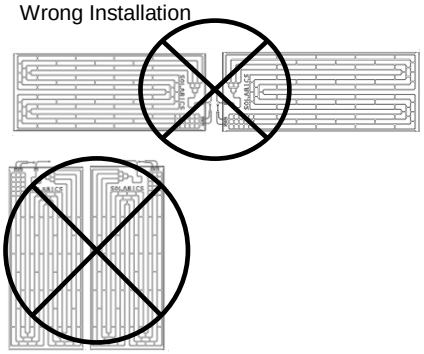
The panels should always be installed downwards with the connections facing down side. Two panels must install in the same style. They must not have one landscape and another portrait. The standard pipe-run distance between Bunsen Air and Bunsen panels is 10 meters. The suggested space among two panels on the connection's side is 90mm.

Improper installation causes the system failure that directly affects the performance and the warranty is invalid.

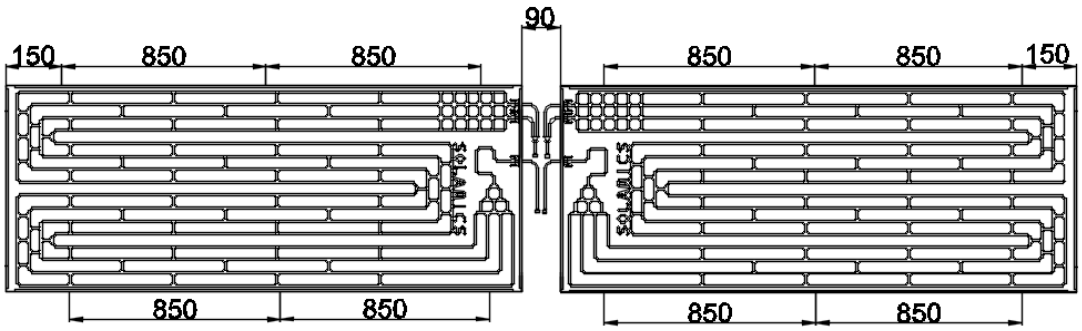
Correct Installation



Wrong Installation



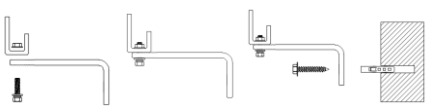
Bunsen Panel Positioning



Each panel must have 6 fixing points for positioning, as below. The positioning of the panel is ensured by L-brackets.

Method 1 - Vertical Wall Installing

To position the panel to a vertical exterior wall or structure, better facing south, L-brackets, nuts, anchors and screws shall be used which can be found in the box of Standard Fitting.



Method 2 - Roof Inclined Installing

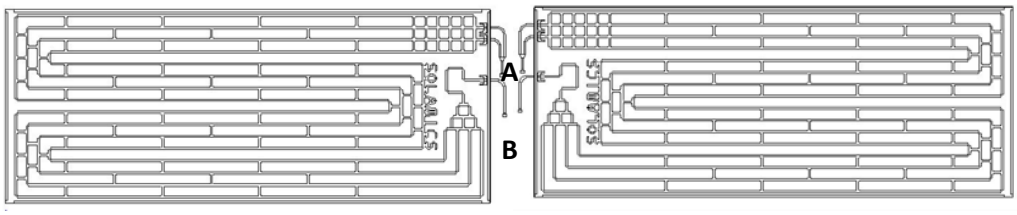
The panel can also be installed on the inclined roof, facing south.

There are more than one positioning solution, and shall be discussed with the installer for alternatives.

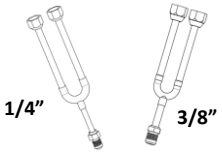
Note

The standard distance between Bunsen Air and Bunsen panel is 10 meters.

Panel Pipe Connection



A – Gas Line (Outlet) B – Liquid Line (Inlet)



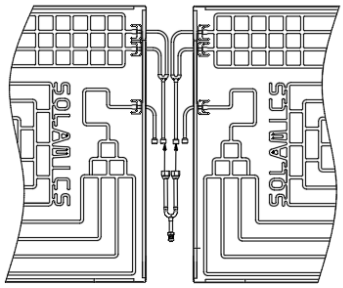
Panels are supplied with stoppers in the pipe connections. It is recommended to leave these in place until the connection is made to avoid any dirt or dust entering the opening.

There are two connections on each panel, Gas Line – outlet and Liquid Line – inlet, which are linked with 1/4” Inlet Line Connection and 3/8” Outlet Line Connection.

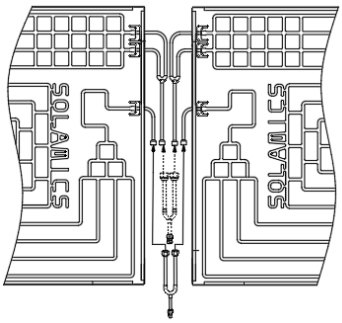
Step 1: Gas Line outlet A linked to 3/8” Outlet Line connection

Step 2: Liquid Line inlet B linked to 1/4” Inlet Line connection

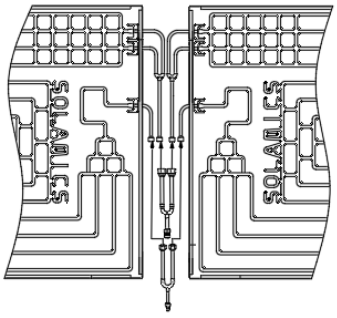
Step 1



Step 2



Finished



Note

When the caps in the connection of the Bunsen panel are removed, there shall be nitrogen from the holes. This is normal to have “gas-out” sound as it means there is no leakage or damage on the Bunsen panel during transportation.

Removing the protective caps from the ends of both line connections.

Tightening and twisting the nut in between Line and connection by spanner according to the values below,

Tube Diameter (inches)	Applied Binary (Nm)	Wrench n°
1/4”	5 ~ 8	19
3/8”	12 ~ 15	21

Refrigerant Pipe Connection

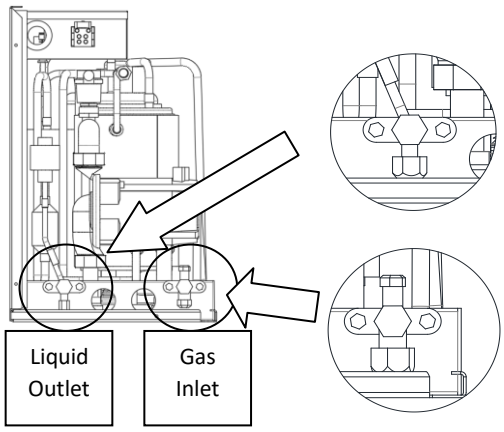
Gas Line and Liquid Line shall be found at the bottom of the Bunsen Air.

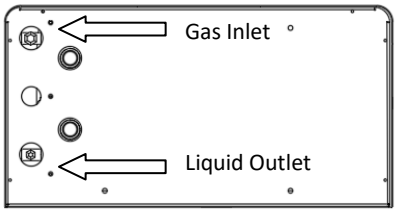
In the package, there are two refrigeration pipes, 1/4" and 3/8” refrigeration pipes, which are used for the connections with 1/4" Inlet Line connection and 3/8” Outlet Line Connection.

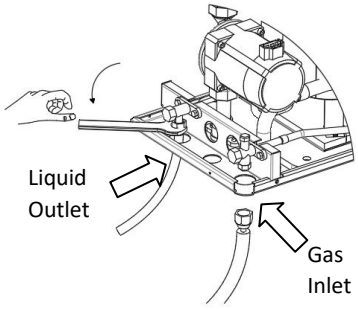
By using the refrigeration pipes, Bunsen Air and Bunsen panel shall be connected.

Step 1: Identify and link the corresponding refrigeration pipes to the corresponding line connections nearby Bunsen panel.

Step 2: identify and link the corresponding refrigeration pipes to the corresponding connections at the bottom of the Bunsen Air.







Note

Removing the protective caps from the ends of both line connections.

Tightening and twisting the nut in between Line and connection by spanner.

The length of two refrigeration pipes must be the same.

The maximum pipe-run distance between Bunsen Air and Bunsen panel is 15 meters, while shall not be less than 5 meters.

All refrigeration pipe-run must be equal in distance.

Caution

All refrigeration work shall be installed by an accredited installer according to EN378. *If the installation is not conducted by an accredited installer, the warranty will be invalid.*

8 Bunsen Air Testing

Leakage test for Pipe Connection

Once all connections between Bunsen Air and Bunsen Panels have been done, the installer has to check for the leakage.

Step 1: Cover all connections with the soap foam and see if there is any leakage.

Step 2: A load of nitrogen at a pressure of 10 bar shall be injected via pressure tap of 3-way valve.

Step 3: Hold and monitor the pressure change for 30 minutes, while check whether any of all connections has leakage.

Step 4: If there is any pressure drop in 30 minutes, or if any leakage is found, identify and fix the leakage. Then conducts the full leak test again until there is no leakage and pressure remains constant in 30 minutes.

Note

The pressure for the leak test must not be over 10bar in both Bunsen panel and pipe connection.

Caution

Warranty requirement that the Nitrogen pressure test and vacuum processing test must be evidenced with a picture, to show the pressure level injected or the vacuum level respectively.

Vacuum Processing

This is a critical process for the system to be completely vacuum before loading the refrigerant fluid. The purpose of this process is to remove all the air and moisture inside the pipe work and Bunsen panel. If the system is not completely vacuum, the system will be soon deteriorated.

Step 1: Start vacuum process by using a vacuum pump.

Step 2: Hold the system in vacuum for at least 30 minutes or less than 20pa shown by vacuum manometer.

Step 3: Make sure no change in the vacuum manometer for 15 minutes after stopping the vacuum pump.

Step 4: After the vacuum process, the two valves shall be opened for the refrigerant to circulate.

Note

Failure of this vacuum process which causes the system deterioration does not include in the warranty period.

The use of a thread sealant is recommended for all existing thread connections.

Caution

For vented system, please adjust the water pump mode from default I / S1 to III / S3. This action can enhance the internal pressure to draw air inside the water pipe.

Standard for vacuum completion: After 10 minutes of system operation, No Unusual Sound from Compressor, and difference of two temperatures on the screen not more than 5 degrees.

Additional Refrigerant Charge

The Bunsen Air is pre-charged with 1400g of refrigerant R134a, sufficient enough for up to 10M of physical separation pipe length between Bunsen Air and Bunsen panel.

The pipe-run length can be extended up to 15 meters of physical separation between Bunsen Air and Bunsen panel. 20g of refrigerant R134a shall be added for every extra 1 meter length of pipe.

Note

It is important for connections between Bunsen Air and Bunsen panel to have as less as bends as possible, in which the load loss shall be minimized. Check the additional refrigerant charge accordingly.

Distance (M)	Addition Charge (g)
5 – 10	No additional charge
11	20
12	40
13	60
14	80
Max 15	Max 100

9 Electrical Connections

Important Notes

Check the following conditions before implementing the electrical connections,

a) The system must only be electrically powered up after all completion of refrigerant connections, hydraulic connections, and full system tests.

b) The water cylinder shall be completely filled and purged.

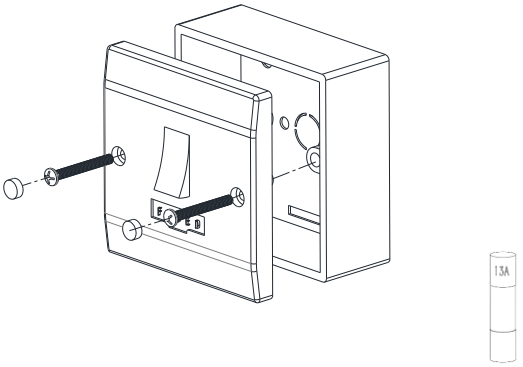
c) The system requires single phase, 220 - 240V / 50Hz power supply with earth connection. This should be separately isolated and protected by an appropriate sized fuse. (Max. 13Amps)

d) The system is supplied with an appropriate fused spur.

e) The system has a connector and terminal Airs which allows the connection of a back-up immersion heater. The maximum rating is 3kW.

f) All electrical sockets connected to the system must be grounded.

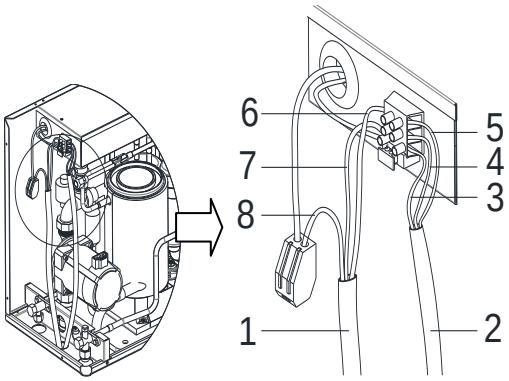
g) Connections should always comply with the installation regulations according to the local electrical code and legislation.



Electrical Immersion

Important Notes

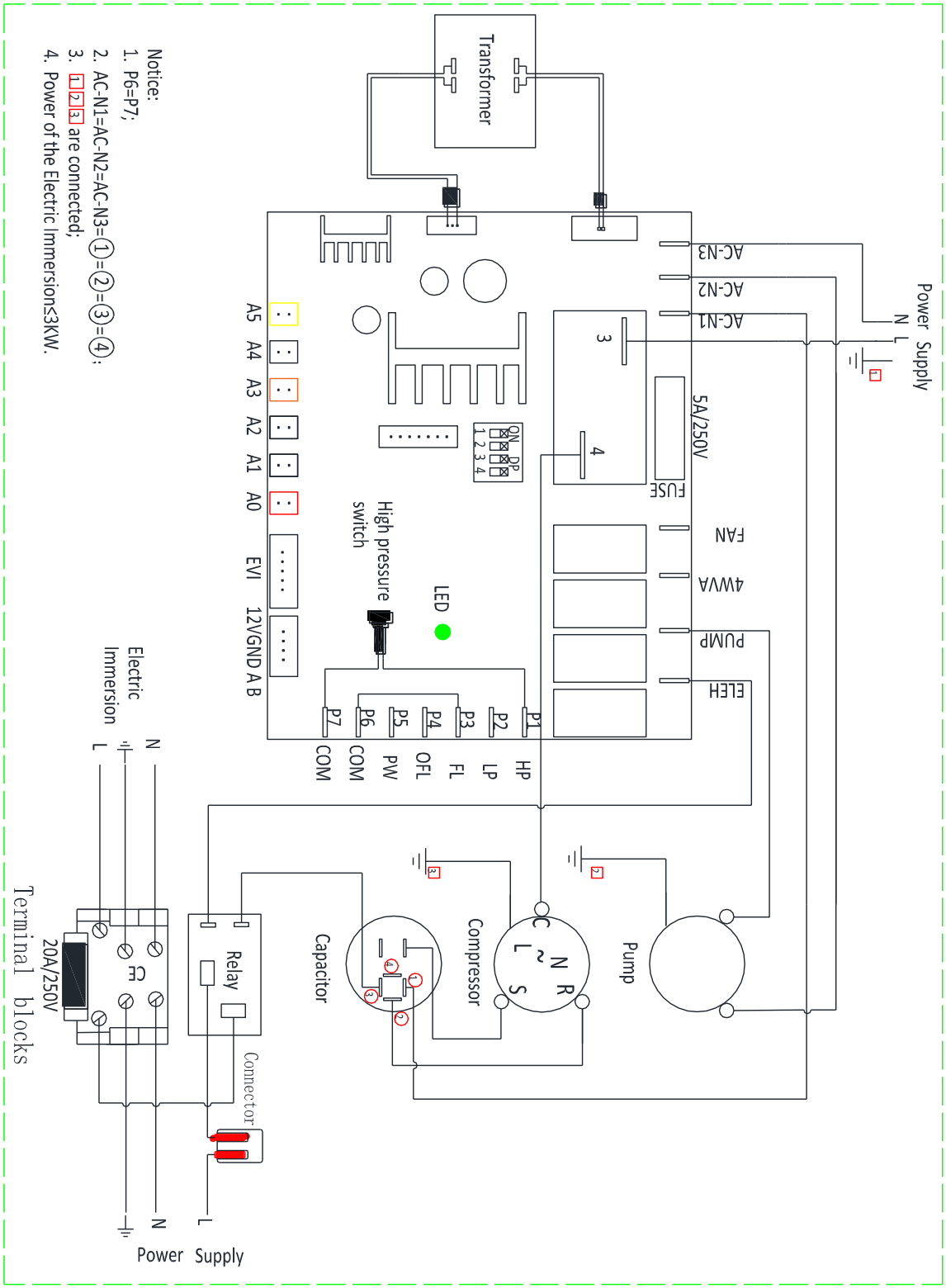
For the diagram with electrical immersion, here below is the connection part.



1. Second Power Supply
2. Immersion
3. Immersion L line
4. Ground
5. Immersion N line
6. Power N line
7, Ground
8. Power L line

Bunsen Air Circuit Schematic Diagram

Diagram with electric immersion



10 Controller Starting and Setting

For the first time when powering up the Bunsen Air, the screen shall light up with blue colour.

The installer shall set up the local time by the following steps,

Step 1: press the button and hold it for 10 seconds until the time shown on the screen is flashing.

Step 2: press the button , the hh shall be flashing, and then adjust the time hh.

Step 3: press the button , the mm shall be flashing and then adjust the time mm.

Step 4: press the button to confirm the adjustment. After 60 seconds, the system shall be automatically locked.

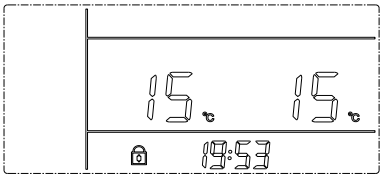
After time setting, start the system,

Step 1: press the button and hold it for 1 second, then heating water signal appears.

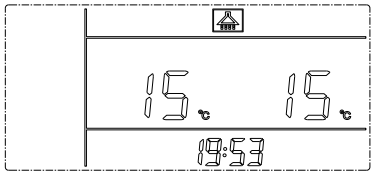
Step 2: 1 second after heating water signal, the water pump signal appears. After 90 seconds, the compressor shall automatically operate.

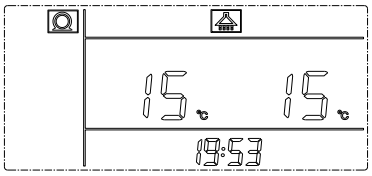
From now on, the system starts operation by default. For further setting, please refer to the "Bunsen Air Digital Controller Manual".

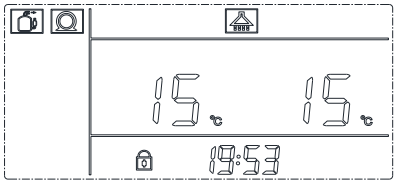
Time setting:



After time setting:







11 System Commissioning

Turn the Bunsen Air on at the fused spur. After 30 seconds the digital controller on Bunsen Air shall light up and show the current temperature of the cylinder and water outlet. The pump shall start to run. After 90 seconds of time delay the compressor shall start operating.

Leave the system to operate for a minimum of 30 minutes and check the following,

1. Check if the default temperature for water heating in the controller is 53℃.

2. Check if the system is increasing the water temperature after 30 minutes.

(Standard: under 7 ℃ of ambient temperature in sunny day, it takes 40 minutes to increase water temperature from 30℃ to 35℃ in good quality 200 Litres of water cylinder.)

12 Tables of parameter and status

Unit parameter table

Parameter	Definition	Setting range	Default	Comments
L2	Compressor activating return temperature difference	2℃~18℃	5℃	
L3	Cylinder Target temperature	35℃ ~ 60℃	53℃	Default 53℃, not over 60℃
L5	Boost temperature	30℃~60℃	45℃	
L6	Duration of High temperature disinfection	0 Min -180 Min	60 Min	
L7	Hour timer of disinfection (hour setting)	00:00-23:00	14	14 = 14:00
L8	Minute timer of disinfection	0-59 Min	0	
L9	Start of large amount water usage time	00:00-23:00	18	18 = 18:00
L10	End of large amount water usage time	00:00-23:00	23	23 = 23:00
L11	Starting 1st Running period	00:00-23:00	8	8 = 08:00
L12	Starting 2nd Running period	00:00-23:00	18	18 = 18:00
L13	Starting 3rd Running period	00:00-23:00	23	23 = 23:00
L14	Target temperature of 1st Running period	0 ~ 60℃	53℃	
L15	Target temperature of 2nd Running period	0 ~ 60℃	50℃	
L16	Target temperature of 3rd Running period	0 ~ 60℃	45℃	
L17	Target temperature of compressor and electrical heater (Immersion) during disinfection	60-63℃	60℃	

Unit status table

Unit Status Code	Definition	Display Range	Display Value	Comments
A0	Cylinder temperature	-31℃~99℃ (Parameter F3=0）		
A1	Coil Temperature	-31℃~99℃	Measured Value	
A2	Return Gas Temperature	-31℃~99℃	Measured Value	
A3	Exhaust Gas Temperature	0℃~125℃	Measured Value	
A4	Indoor Ambient Temperature	-31℃~99℃	Measured Value	
A5	Water Outlet Temperature	-31℃~99℃（Parameter F3=0）	Measured Value	Only when water pump is connected
A9	Expansion Valve Steps	6~50	Measured Value	Step=display value*10
E1	Error Code	Error Code (05 …. 29)	Error Code No.	Latest Record
E2	Error Code	Error Code (05 …. 29)	Error Code No.	Second Record
E3	Error Code	Error Code (05 …. 29)	Error Code No.	Third Record
E4	Error Code	Error Code (05 …. 29)	Error Code No.	Fourth Record
E5	Error Code	Error Code (05 …. 29)	Error Code No.	Five Record
E6	Error Code	Error Code (05 …. 29)	Error Code No.	Last Old Record

13 Inspection and Maintenance

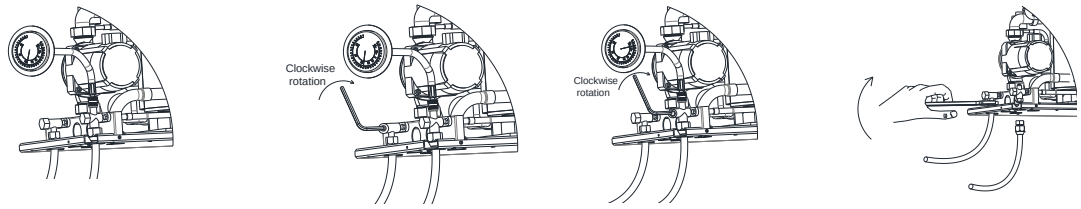
The Bunsen Air should be cleaned with water only and if necessary non-abrasive detergent.

Note: When cleaning, please make sure that the main electrical supply is turned off and do not clean the panel if in the direct sunlight.

The system should be drained off if the Bunsen Air is out of usage for a prolonged time period and the electrical supply to the Bunsen Air should be isolated.

14 Relocation after first Installation

Sometimes the user may want to relocate their Bunsen Air after first installation. It is important to keep all refrigerant inside the system before relocation. Here below are the steps,



Steps:

1. Keep the Bunsen unit on.

2. Connect the pressure gage with the valve quickly.

3. Turn the valve clockwise to the end (stop the gas out from Bunsen unit)

4. Immediately close the service valve and then Switch off the system after the value of the pressure gage is 0 or below

5. Remove the pipe-work and the gage. Now relocate for installation.

15 Trouble Shooting

Sensor outputs can be accessed from the display to help evaluate performance issues and support trouble shooting.

The following table lists the error code warnings that protect Bunsen Air.

Suggested Actions

- Contact the installer to check for a common fix.
- Search for the Trouble Shooting Solution to find known solutions

Error Code Table

Error Code	Name of Error Code
05	High pressure protection
09	Communication error
12	Exhaust gas superheat
15	Water cylinder temperature probe error
16	Coil temperature probe error
18	Exhaust gas temperature probe error
21	Ambient temperature probe error
27	Water outlet temperature probe error
29	Return gas temperature probe error

Troubleshooting Guide

Problems	Causes	Solutions
Communication error (error code 09)	1. White communication line is disconnected	1. Restore the line connection 2. Replace a new one
Screen does not show any information.	1. Lack of Power	1. Check the power supply, make sure the power switch is on.
	2. Fuse damage in main control	2.Replace fuse
High pressure protection switch is on (error code 05)	1. Air in the hydraulic circuit	1. Check the functioning of the water pump and bleed the pump. Bleed the air through into air vent
	2. Water filter blockage	2. Check, clear or replace water filter
	3. Temperature probe in the cylinder is disconnected or loose	3. Restore the temperature probe connection
	4. Excess refrigerant	4. Check refrigerant pressure by manometers and adjust back to the normal level
	5. Fluorine filter system blockage	5. Check or replace fluorine filter
	6. Main control board damage	6. Replace main control board
	7. Pressure switch damage	7. Check or replace pressure switch
	8. Condenser fouling	8. Clear or replace condenser
	9. Expansion valve damage	9. Check or replace expansion valve
Overheat excel gas (>125°C) (error code 12)	1. Refrigerant gas leak	1. Check for leaks in the refrigeration circuit
	2. Lack of refrigerant	2. Vacuum the closed system and re-fill refrigerant charge
	3. Temperature probe in the cylinder is disconnected or loose	3. Restore the temperature probe connection
Temperature probe malfunction (error code 15, 16, 18, 21, 27, 29)	1. Temperature probe disconnected 2. Temperature probe line shortcut	1. Check the temperature probe line connection 2. Replace a new one
Water is still cold when the compressor is working	1. Pipe-work between Bunsen air and solar collector panel is not insulated properly	1. Check the proper insulation of the hydraulic circuit, pipe-work and cylinder
	2. Refrigerant gas leakage	2. Repair leakage and refill refrigerant gas
	3. Lower set temperature	3. Check the temperature set point on screen
	4. Compressor damage	4. Replace compressor

Remark: Every time after checking and fixing, please switch on the machine and monitor its operation for 20 minutes before leaving.

16 General Conditions of Guarantee

The product must be installed and commissioned in line with the manufacturers recommendations as set out in the installation manual and any other material. The guarantee must be activated within 15 days of commissioning by completing the guarantee card and returning it to the manufacturer. Solamics will not be able to provide free assistance under these terms if you do not activate your guarantee within 15 days of installation. This does not affect your statutory rights. The Guarantee Registration Form could be completed online at www.solamics.com/warranty.

The installer or sales company should always be the end-users first point of contact in the event of a breakdown or other malfunction of the product. Only if or when confirmed that there is a fault with the Product and not with the installation design or operation, then contact should be made with Solamics.

By this guarantee, the Bunsen panel has a 10 year guarantee AND Bunsen Air has a 2 year guarantee, in which it is on a 'return to factory' basis where the unit will be either repaired or replaced.

ATTENTION: *SOLAMICS is not responsible for any shipping costs associated with guarantee returns. SOLAMICS is not responsible for any technical assistance costs that even within the warranty period shall be supported by the customer themselves (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.*

The present guarantee does not have effect if the general conditions of sale have not been met between the supplier and the domestic end user for the specified equipment, or if the agreed payment terms have not been respected. The end user or customer does not have any right to make any claim for compensation during the time the equipment is damaged or under repair or for damages caused directly or indirectly.

IN ORDER FOR THE GUARANTEE TO TAKE EFFECT, IT IS ESSENTIAL THAT THE GUARANTEE COMPLETED ONLINE REGISTRATION WITHIN 15 DAYS SINCE INSTALLATION AT: www.solamics.com/warranty

Guarantee Terms and Conditions

The Guarantee shall be subject to the following conditions: Its installation shall be carried out in accordance with the instructions of manufacturers and in compliance with all the technical and safety standards, whether they are European, national or autonomous. The installation shall also be undertaken by qualified technicians.

The Guarantee shall be null and void if any of the following takes place:

- Incorrect equipment is used for installation.
- The equipment has been installed by staff other than an F Gas qualified engineer.
- The equipment has been used for purposes other than those described in the use and deployment standards or in some way other than that recommended in the mentioned standards.
- The usage and maintenance instructions have not been complied with.
- Water supply for the unit that meets some of the following criteria:
  Chlorides content > 0.2ppm, pH value<6 or >9 (scale Sorensen a 25ºC), CaCO3 content >200 ppm, conductibility > 600 µS/cm (20ºC). In general water with values exceeding ceilings stipulated by related legislation in customer's country.
- Absence of security group in the inlet system according to the legislation.
- System malfunction arising from improper installation of the hydraulic circuit components and/or buffer cylinder.
- Installation of elements outside the specifications of the installation manual.
- Damage resulting from improper anchoring equipment.
- Unit malfunction due to lack of thermal insulation in the installation
- Incorrect placement of Bunsen panel or appliance
- The equipment has received an overload of any nature: electrical, water pressure etc.
- Malfunctions brought about by chance or force majored: atmospheric, geological phenomena etc.
- The equipment has not been delivered in its original box.
- Damage from atmospheric and external agents: Freezing, dirt, transport, or accidental impacts.
- Damage derived from an unusual supply of electricity, water or air (including over pressure and over voltage).
- Damage caused by natural wear and tear in metal or plastic – levers, switches, resistances, programmers, thermostats, etc.
- Breakdowns caused by the replacement of parts or elements not original or authorized in writing by the manufacturer.
- Damage occurred by the unusual corrosion of the heat exchanger and/or the hydraulic circuit caused from reaction with the circulating fluid.
- Damage derived from the installation itself.
- Damage incurred by vandalism acts, war, fire, etc.

17 User Registration – Guarantee Card

Please spend time on registering your new Bunsen Air as a required part to the Warranty activation, and complete it online.

Customer Data:			
First Name:		Last Name:	
Address:			
City / Country:		Postal Code:	
Email:		Contact Tel:	

Sales Company Data:		**Installer Data:**	
Name:		Name:	
Address:		Address:	
City / Country:		City / Country:	
Postal Code:		Postal Code:	
Phone:		Phone:	
Email:		Email:	

Product Data:			
Model:		Serial Number:	
Installation Date:		No. of Invoice:	
Customer Cylinder Capacity (L):			

IN ORDER FOR THE GUARANTEE TO TAKE EFFECT, IT IS ESSENTIAL THAT THE GUARANTEE COMPLETED ONLINE REGISTRATION WITHIN 15 DAYS SINCE INSTALLATION AT: www.solamics.com/warranty

NOTE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