



Instruction booklet and
warning
Installer
User
Maintenance technician

IE

SOLARSMART 110
SOLARSMART 110R
SOLARSMART 150
SOLARSMART 150R
SOLARSMART 220
SOLARSMART 220R
SOLARSMART 260
SOLARSMART 260R

1.043519ENG



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INSIDE THE BOX

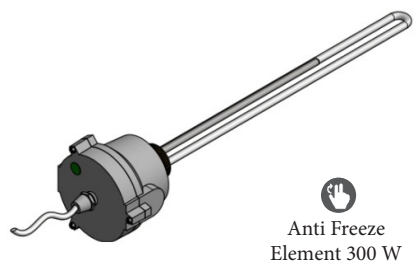
Components that are supplied standard

Before starting to install the product, make sure all the components are present:



LETTER	COMPONENT	QUANTITY [PIECES]
-	SOLARSMART solar collector with integrated storage	1
a b	BASIC SUPPORT: pair of galvanised sheet supports for flat roof	1 right + 1 left
c d e	hammer head screw, washer and nut for fixing	4
f	3/4" flat gasket for high temperatures	4
g	safety and one-way valve, MF 3/4" connections	1
h	Air feed valve (backflow preventer), MF 3/4" connections	1
i	Pair of lower fixing shafts, non-slip, made of AISI 304, for sloped roof	2
l	Pair of lower side fixing shafts made of AISI 304, for sloped roof	2
m	PVC cover sheet	1
n	Installation and user handbook	1

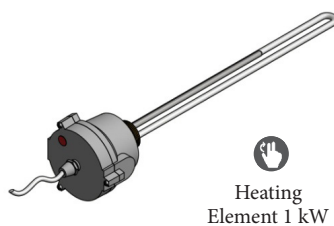
ACCESSORIES (OPTIONAL)



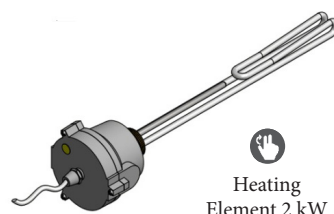
Anti Freeze
Element 300 W

ANTI FREEZE ELECTRIC RESISTOR
(power 300 W-230V)

Article code: 3.029920



Heating
Element 1 kW

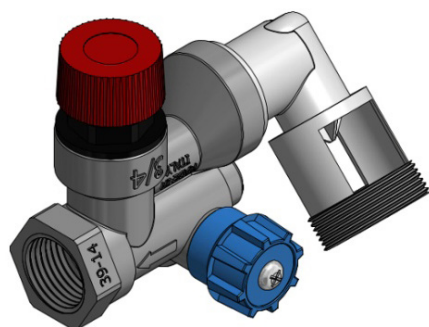


Heating
Element 2 kW

ELECTRICAL RESISTOR FOR INTEGRATION
1 and 2 kW

Article code: 3.029921

3.029922



SAFETY AND ONE-WAY UNIT
with MF $\frac{3}{4}$ " connections

Article code: 3.029918



PRESSURE REDUCER
with MF $\frac{3}{4}$ " connections

Article code: 3.029919

- Follow the component assembly instructions;
- if using accessories, follow their pertinent options and limits of use;
- only use genuine components. Should it be discovered that non-genuine components have been installed, the manufacturer can refuse all guarantee rights.



Dear Customer,

our compliments for having chosen a top-quality Immergas product, able to ensure well-being and safety for a long period of time. As an Immergas Customer, you can also count on a qualified after-sales service, prepared and updated to guarantee constant efficiency of your boiler. Read the following pages carefully: you will be able to draw useful tips on the correct use of the device, compliance of which will confirm your satisfaction with the Immergas product.

For any assistance and scheduled maintenance please contact Authorised After-Sales centres: they have original spare parts and are specifically trained by the manufacturer.

GENERAL RECOMMENDATIONS

- This document is an integral and essential part of the product. It is to be used by the installer and the end user, who must keep it carefully after the system has been installed and started.
- The manufacturer is not liable for any damage deriving from incorrect observation of the instructions and indications given in this document, those relative to possible accessories supplied with the system and for the non-observance of pertinent applicable national and local laws.
- Before installation and use, obtain information on the current regulations and laws in the place where the system is to be installed.
- The SOLARSMART solar collector with integrated storage was designed and manufactured to produce domestic water that is heated by solar power. Any use other than that indicated relieves the manufacturer from any responsibility and renders all guarantees null and void.
- All technical drawings, plant layout and electric wiring diagrams etc. that are present in this manual are indicative and are only given as examples. All connections, the safety devices, diameter sizes and any other thing necessary for correct system installation must be verified by a qualified and expert technician, who must make sure of their correspondence with regulations and laws in force.
- The manufacturer is not liable for any damage caused to the product resulting from assembly that is not state-of-the-art.



INDICATIONS FOR SAFETY

- This product must be installed by a professionally qualified company or technician, according to national and/or local laws in force and the instructions given in this handbook.
- Maintenance and cleaning must also be carried out by specialist companies or staff with the pertinent technical qualifications.
- The term 'professionally qualified technician' indicates a person with specific technical skills in water for domestic use, as well as in heating systems, gas systems and electric systems. This person must have the professional skills indicated by law.
- On the basis of the user guidelines, whoever uses the system must keep it in good condition and guarantee that it works safely and correctly.
- The system user must ensure that the maintenance indicated in this handbook (see the Programmed maintenance chapter) is carried out.
- Do not leave parts of the packaging or the system within the reach of children.
- Before cleaning or carrying out maintenance, disconnect the power supply from any electric accessories that may be present.
- Dispose of the various packaging elements in a suitable manner.
- Check the pressure of the water transportation network: if the pressure is higher than the nominal pressure of the product (4 bar = 400 kPa), prepare the necessary reduction units before the connection and regulate the pressure (see Hydraulic connection chapter)
- Should faults occur, or if the system does not operate correctly, do not attempt to repair the product. Instead, disable it and contact a specialist technician. Should it be necessary, components must only be replaced with original spare parts, which must be installed by qualified technicians. Should this not be the case, the manufacturer reserves the right not to recognise any guarantee rights.



PROTECTION FROM VACUUM OVERHEATING

- The SOLARSMART solar collector with integrated storage is supplied equipped with a PVC cover sheet which darkens the surface that collects the sun's rays, therefore protecting the product against overheating caused by direct exposure, above all in the case when the collector has been installed but is not connected to the water system (therefore no water present). The collector, in fact, was not designed to be exposed directly to the sun's rays without being filled with water.
- Exposure to the sun when the system is empty can damage the product; in this case the manufacturer will not recognise any guarantee rights.
- The cover sheet must be left on the solar collector until it is started (see also the Starting chapter). Should it be necessary to empty the system for maintenance or as a no-freeze function, it should be covered by the cover sheet (white part towards the collector).



PROTECTION FROM BURNS

- **Danger!** The water inside the collector can reach temperatures of approximately 90 °C. To prevent the danger of burns and/or scalds, be extremely careful when:
 - connecting the hydraulic supply to the domestic water supply;
 - loading and unloading the system;
 - carrying out any intervention on the hydraulic connection



Always position a thermostatic mixer valve between the system outlet and the domestic water user (see Hydraulic connection chapter).

- In general, do not touch the transport pipes or the hydraulic connections and the internal accumulation tanks while the system is operating.
- Should it be necessary to empty the system while it contains hot water:
 - do not discharge directly onto the roof or into the ground;
 - use a flexible hose to safely lead the water to a drain.

PROTECTION AGAINST LIGHTNING

- Pursuant to the Directive EN 62305 1-4, the SOLARSMART solar collector with integrated storage must not be connected to the protection system used by the building against lightning, unless indicated otherwise by local laws in force.
- Have a technician or skilled electrician check the installation area for this possibility.
- All metal structures that are present, therefore also the supporting structure and fixing shafts of the system, must have the same electric potential as the building. It is therefore good practise to prepare suitable earthing for the metal parts of the system.
- This can be done by a skilled electrician and the evaluation of the equipotentiality level evaluated by a skilled electrical engineer.



LAWS AND REFERENCE STANDARD

- UNI EN 12976-1:2006
- UNI EN 12976-2:2006
- UNI EN 1991:2004 PARTS 1-2,1-3,1-4 (Actions on structures)
- Direttive 97/23/Ce
- UNI EN 1717:2002

The company IMMERGAS S.p.A., with registered office in via Cisa Ligure 95 42041 Brescello (RE), declares that the design, manufacturing and after-sales assistance processes comply with the requirements of standard **UNI EN ISO 9001:2015**.

For further details on the product CE marking, request a copy of the Declaration of Conformity from the manufacturer, specifying the appliance model and the language of the country.

The manufacturer declines all liability due to printing or transcription errors, reserving the right to make any modifications to its technical and commercial documents without forewarning.

SAFETY SYMBOLS USED.



READ AND UNDERSTAND THE INSTRUCTIONS

Read and understand the appliance's instructions before performing any operation, carefully following the indications provided.



INFORMATION

Indicates useful tips or additional information.



Material to be obtained (not supplied)



Connection to the water supply



2 people necessary



Qualified electrician



Qualified designer



Tighten/loosen manually



Tighten with spanner



Perforate with drill



The user must not dispose of the appliance at the end of its service life as municipal waste, but send it to appropriate collection centres.



DANGER! Generic danger



Risk of falling from a height



Risk of burns



Risk of falling material from above



Danger of overpressure



Danger of electric shocks

PERSONAL PROTECTIVE EQUIPMENT.



PPE must be used



Non-skid footwear must be used



Cut resistant gloves must be worn



A protective helmet must be worn



PPE must be used when working at heights



Protective goggles must be worn

1 INSTALLATION.

1.1 GENERAL INDICATIONS AND MOVING.

Assembly, maintenance and cleaning must only be carried out by companies and specialist staff.

The components indicated in this handbook must be used when assembling. The use of other material is under the responsibility of the installer, who assumes full responsibility, including the product guarantee.

The manufacturer is not liable for any work not carried out in a state-of-the-art manner, and for any damage caused to the structure or the tools used.

Before installing and using the system, it is advisable to check local regulations and laws to make sure that what is described in this document complies with them. Should they be different, do not install the system and contact the manufacturer.

The manufacturer is not liable for any damage caused to things and injury to people as a result of installation carried out without respecting local regulations and laws.



The system can only be moved when empty and extremely carefully. Do not use or apply force to the plastic threaded connections in order to lift the product.

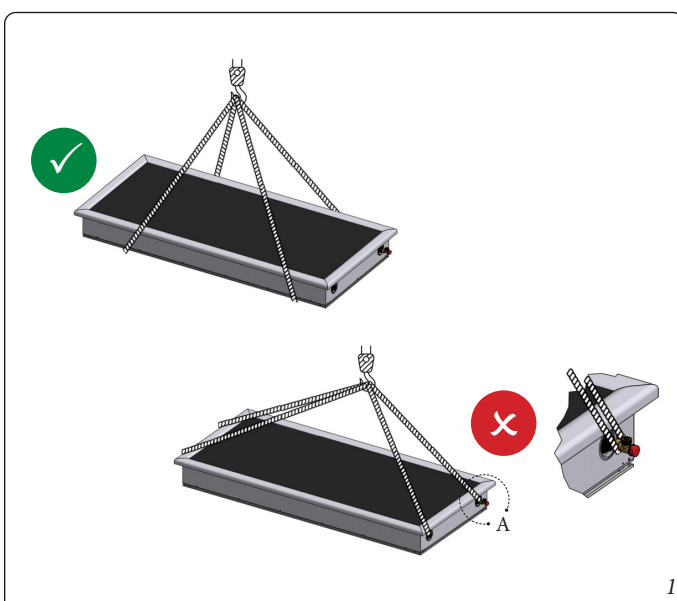


Avoid knocks and pressure on the system, in particular on the cover, base and the plastic connections that project from the frame.



Do not place any load on the system.

When moving, always use people who are competent, trained and equipped according to what is imposed by laws in force. Always use means of transport, lifting devices, chains and any other things that are of a suitable capacity and size.



1

1.2 STRUCTURAL CHECK.

The SOLARSMART solar collector with integrated storage can be placed on the ground or on a structure (attic, covering, balcony, etc...) that can support the device weight and dynamic actions caused by variable things (e.g. wind, snow,...), considered with the presence of "SOLARSMART" solar collector with integrated storage.



In the case of already-existing buildings in particular, all combinations of the static capacity of the structural elements and anchors used must be carefully evaluated, according to what is indicated in the technical standards for construction (NTC 2008, in Italy), or the Eurocodes (EN 1991, in Europe). This check must be carried out by a structural technician who is authorised to work in the installation area.



Be very careful of the load increase caused by snow or strong wind. The manufacturer is not responsible for damage to things or injury to people caused by bad installation on structures that cannot support the indicated loads.



1.3 SAFETY PRECAUTIONS WHILE ASSEMBLING.

Danger caused by wind



Install when the weather conditions are good, avoid rainy days and strong winds.

Risk of falling from a height



Solar systems often need to be installed at a height. Operators must follow regulations and laws in force regarding safety.

Danger caused by hanging loads and material falling from a height



If material needs to be lifted using a crane or machinery, apply all the pertinent recommendations and regulations in order to carry out these operations safely. Use suitable means of the correct capacity. Mark off the area where the lifting is being carried out, to prevent risks caused by objects falling from a height.

ATTENTION:

If there are no collective fall arrest systems (e.g.: railings, protection nets, etc...) personal protective equipment (PPE) must be used to prevent falls, as defined by safety at work standards in force.

The usual PPE must be worn for all installation operations (drilling, moving, etc...).



Risk of electric shock

Only work near overhanging power cables where contact is possible if:

the power has been disconnected from the cables for the whole duration of the work to be done

the cables are protected by suitable barriers or safety guards

the cables are more than 5 m away from where the work is being carried out.

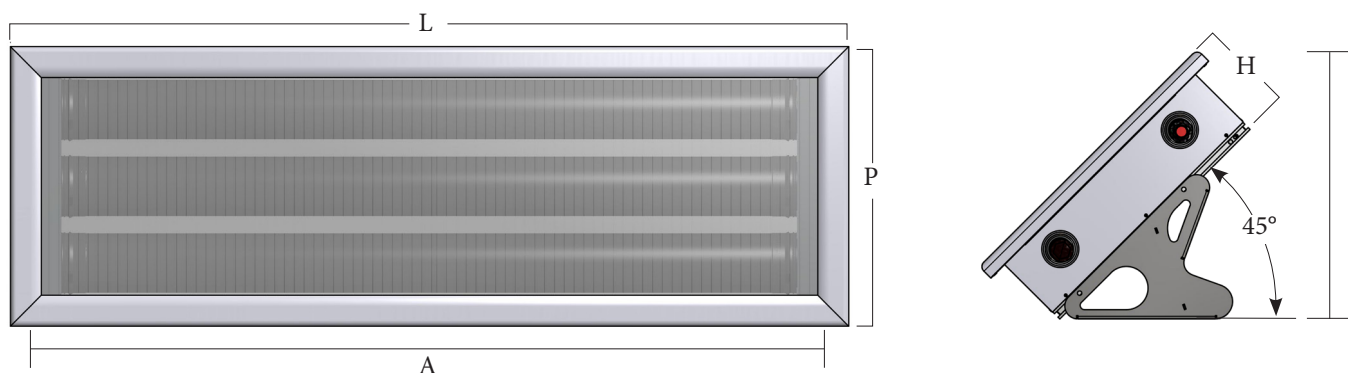


INSTALLER

USER

MAINTENANCE TECHNICIAN

1.4 MAIN DIMENSIONS.



2

MODEL BIANCO LUNARE	SOLARSMART 110 3.029661	SOLARSMART 150 3.029663	SOLARSMART 220 3.029665	SOLARSMART 260 3.029667
MODEL ROSSO COPPO	SOLARSMART 110-R 3.029660	SOLARSMART 150-R 3.029662	SOLARSMART 220-R 3.029664	SOLARSMART 260-R 3.029666
External dimensions (L x P x H)	2.136 x 711 x 217mm	2.136 x 906 x 217mm	2.136 x 1.296 x 217mm	2.136 x 1.491 x 217mm
Inclination height 45°(h)	620mm	760mm	1035mm	1170mm

1.5 SPECIFICATIONS ON WATER QUALITY.

The supply water of the SOLARSMART solar collector with incorporated accumulator tank must permanently comply with the limits indicated in the following table:

PARAMETER	MEASURING UNIT	REFERENCE VALUE
pH	-	6,0 - 9,5
Chloride	mg/l	< 2500
Residual disinfectant	mg/l	< 0,2
Iron	µg/l	< 400
Sulphate	mg/l	< 500
Conductibility	µS/cm at 20°C	< 2500

For any parameters not listed in the table, the limits imposed for water intended for human consumption are applicable, as laid down by Directive 98/83/EC and subsequent amendments, and as transposed by the respective decrees of each EU Member State, including the outermost regions (ORs) and overseas countries and territories (OCTs). For non-EU countries, the limits set by the local regulations shall be applicable.

The collector cannot be used with sea water, swimming-pool water, or any other fluids differing from water. The use of water that fails to comply with the provisions in this paragraph will invalidate the product warranty. The electrical resistors (antifreeze and integration) can be used with chlorine levels up to twice the limit imposed by Directive 98/38/EC and subsequent amendments.

1.6 HARDNESS

It is recommended to use water with a hardness of between 10° F and 30° F. In the case of water with a greater hardness than 30° F it is recommended to carry out a softening treatment, otherwise the SOLARSMART solar collector and its components, such as the by-pass valve, safety and non-return valve, electric resistors, etc., may be subject to limestone deposits and as a result, any damage to the collector caused by the malfunctioning of the aforementioned components (valves and resistors) will not be covered by the warranty.

Damage to the valves and resistors as a result of the hardness of the water, should this exceed the recommended limits, will not be covered by the warranty.

If the water has a hardness of over 30°F and is not softened, there could be a drop in the final yield and it will be necessary to carry out periodic maintenance operations on the valves and resistors, with an appropriate frequency depending on the hardness level in order to guarantee correct operation over time.

1.7 INSTALLATION ON A FLAT ROOF.

Never remove the cover sheet if you have not finished installing the panel and if the collector has not been filled. The SOLARSMART solar collector with integrated storage was not designed to be exposed to sunlight when empty.



Do not move or force the solar collector using the threaded connections or the caps.

PLACE AND POSITION.

Select an installation place that makes it possible to reduce accidental loads (wind, snow, etc...) to which the system can be subjected. As an example, avoid areas where vortices form, or which are subjected to wind because of thermal inversion. If situations like this are present, get a structural technician to check the maximum structure loads.



If installing on a flat roof, position the collector at least 1-2 metres from the edge.

If installing on the ground, position the collector at least 1-2 metres from any obstacles that are present.

Direct the transparent surface as close to the south as possible. If deviated slightly towards the east or the west, the system still works in a satisfactory manner. Choose an installation area where the panel remains in the sunlight for as long as possible. Nearby obstacles (trees, buildings, etc...) can temporarily shade the system and reduce (even greatly) its performance.

If positioning several collectors behind each other, do not let them shade each other. To prevent this, keep enough distance between them to permit radiation without shade when the sun is at an angle of 15° from horizontal.

For the system to operate correctly, install the collector at an angle of between 15° and 60°. The supplied supports, if placed on a flat surface, give 45° installation.



The anchor points must all be on the same supporting surface. Any torsion force caused by supporting points that are not aligned can damage the system.

The longest side of the collector must always be supported by the surface. Do not install the collector with the short side (where the connections are) against the surface.

DO NOT TURN THE COLLECTOR UPSIDE DOWN. The outflow should be positioned at the top, and can be identified by its red cap (inflow at the bottom, identified by a blue cap). Correct operation cannot be guaranteed if the system is installed upside down.



Necessary items:

n.2 spanners 13 mm, individual PPE (helmet, gloves, goggles, etc...)



Danger! The screws for fixing the supports to the roof are not supplied. They must be obtained by the installer, depending on the specific fixing conditions and following the indications of the structural technician.



INSTALLER

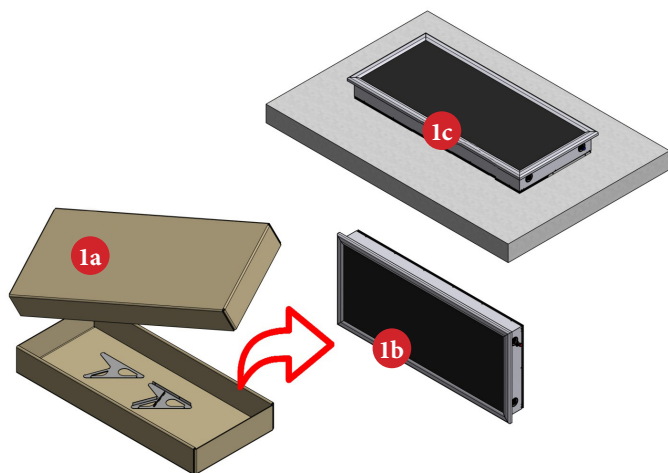
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MAINTENANCE TECHNICIAN






INSTALLATION PHASES FLAT ROOF

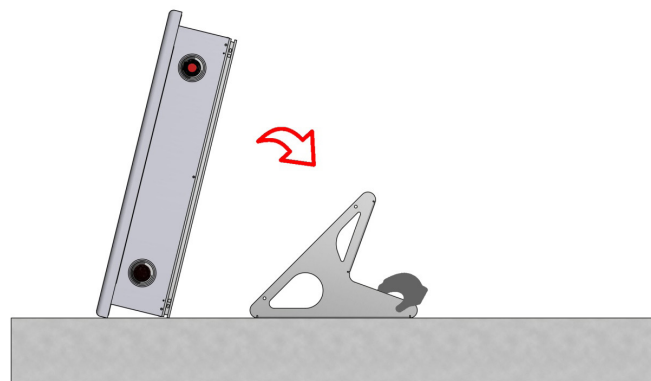
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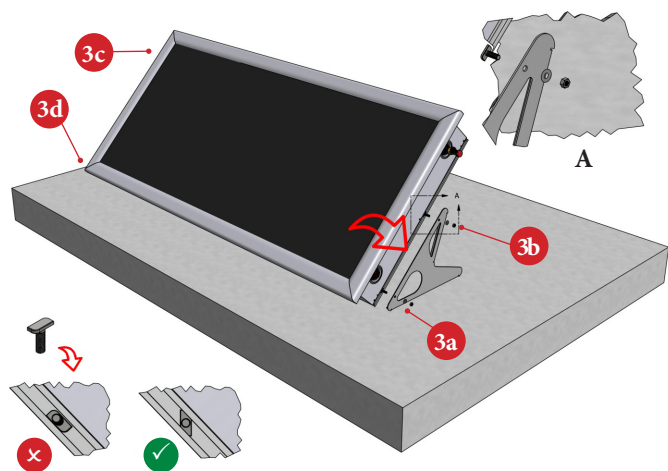
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	SNOW LOAD		WIND LOAD	
	1,2	kN/m ²	100	Km/h



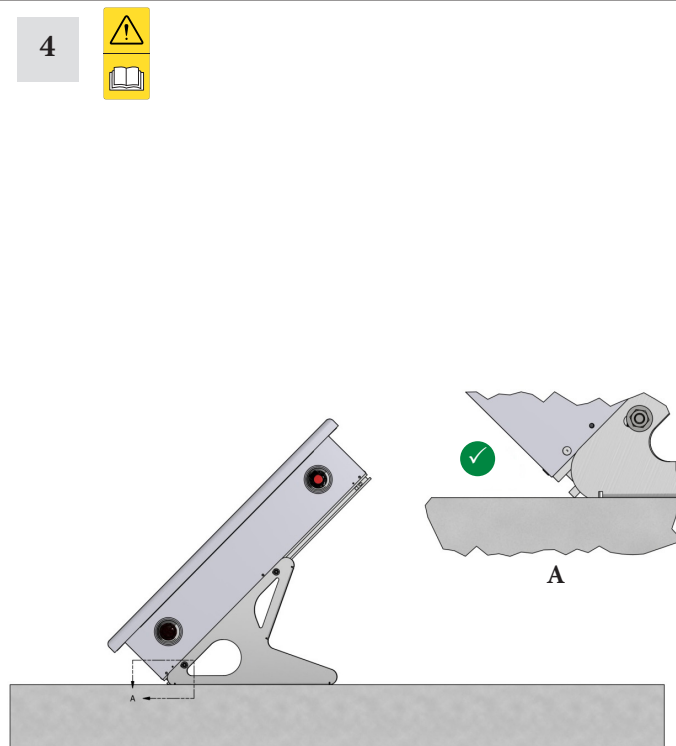
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3 13 - Max 20 Nm 



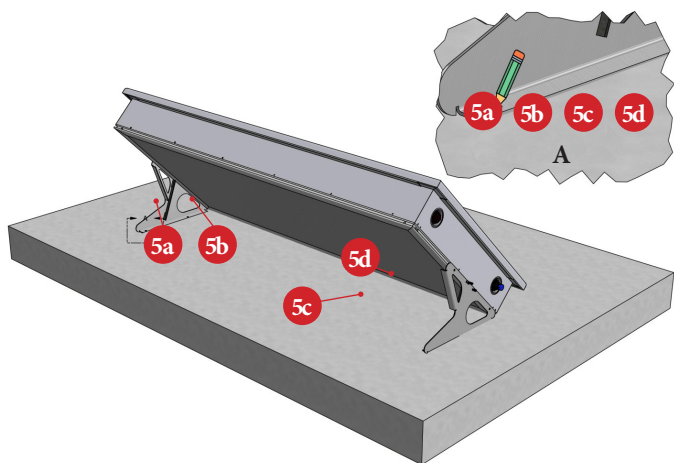
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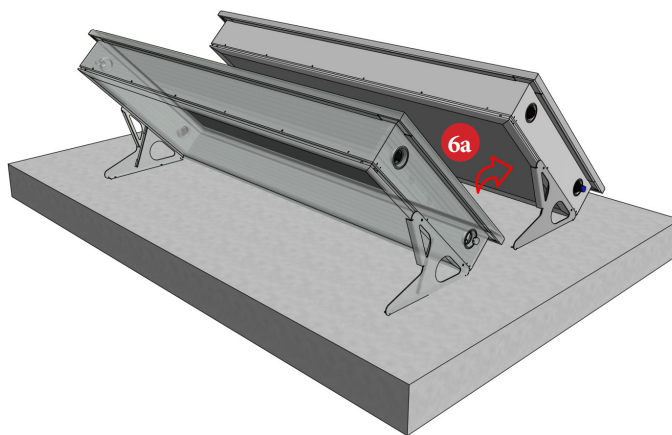
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4d

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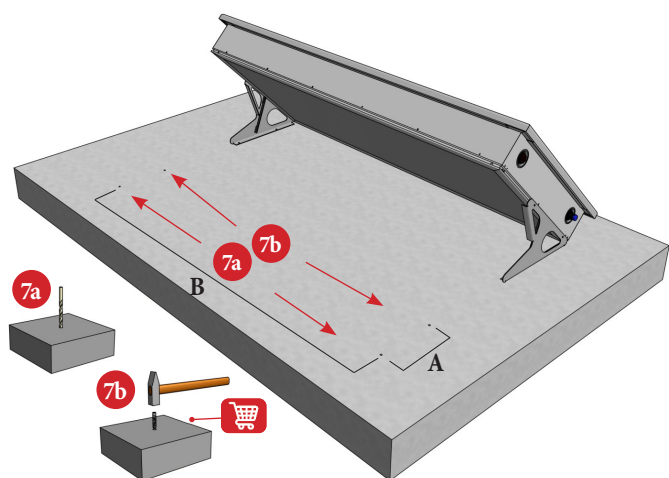


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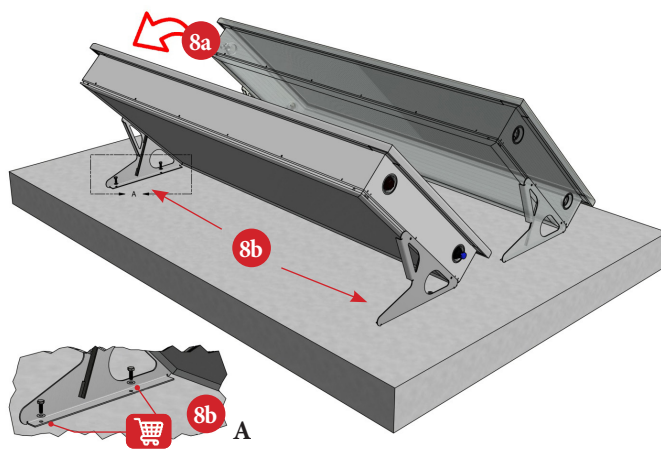


SOLARSMART	A	B
110	150	2050
150	250	2050
220	500	2050
260	600	2050



4f

8



4g

ANCHORING WITH BALLASTS.

If SOLARSMART solar collector with integrated storage cannot be anchored to the roof structure because the supporting surface cannot be drilled (e.g. because of waterproof coating) and if the supporting structure is strong enough (ask a structural expert for confirmation), the system can be anchored to ballasts that are sized according to the wind and snow, as well as to the weight of the collector when both full and empty.



In particularly windy areas, an additional safety system should be added to the ballasts, with a suitably-sized steel cable anchored to a solid part of the building that can hold the system.

The ballasts and cable must be sized by a structural technician who is authorised to work in the installation area, as indicated by Eurocodes (EN 1991) or NTC 2008 (Decree 14 February 2008) if in Italy. The structural technician must also verify the resistance of the building.



1.8 INSTALLATION ON A SLOPED ROOF

Never remove the protective sheet if you have not finished installing the panel, and if the collector has not been filled. The SOLARSMART solar collector with integrated storage was not designed to be exposed to sunlight when empty. Do not move or force the system using the threaded connections or the caps.



PLACE AND POSITION

Carefully check the state of the cover and the supporting structure. Get a structural technician to check the maximum loads of the building, considering the weight of the system when full as a permanent load, as per the UNI EN 1991 (Eurocode) verifications.



Prefer the slope that faces south. Alternatively, the system works in a satisfactory manner when positioned on a roof slope that is positioned slightly to the south-east/south-west. Choose an installation area where the panel remains in the sunlight for as long as possible. Nearby obstacles (trees, buildings, etc...) can temporarily shade the system and reduce (even greatly) its yield.

For correct operation, install the collector at an angle of no less than 15°; the collector must, in any case, be against the slope, therefore follow the angle of the roof.



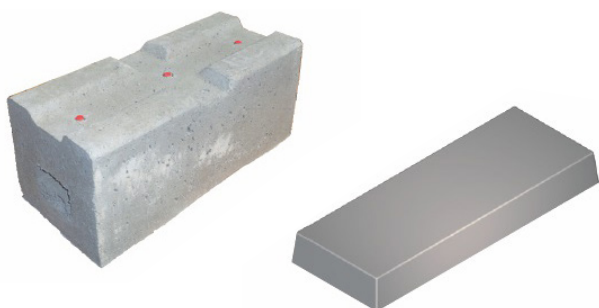
The collector must always have its longest side parallel to the roof eaves. Do not install the collector with its short side parallel to the eaves (see fig. below).

Do not turn the collector upside down. The outflow side should be positioned at the top, and can be identified by its red cap (inflow at the bottom, identified by a blue cap). Correct operation cannot be guaranteed if the system is installed upside down.

The screws for fixing the supports to the roof are not supplied. They must be obtained by the installer, following the indications of the structural technician.

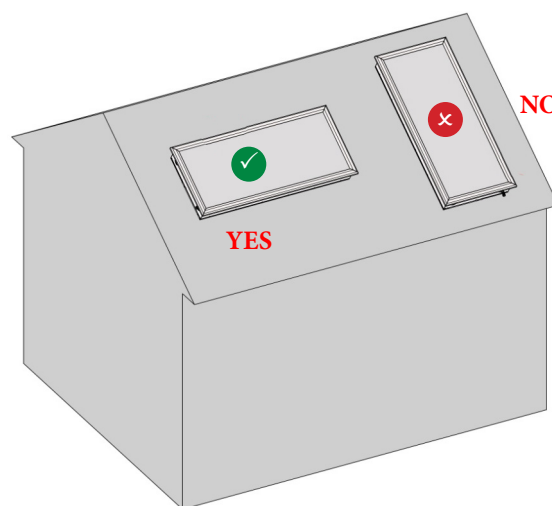


Necessary items:
n.2 spanners 13 mm
Individual PPE (helmet, gloves, goggles, etc...)



Examples of ballast





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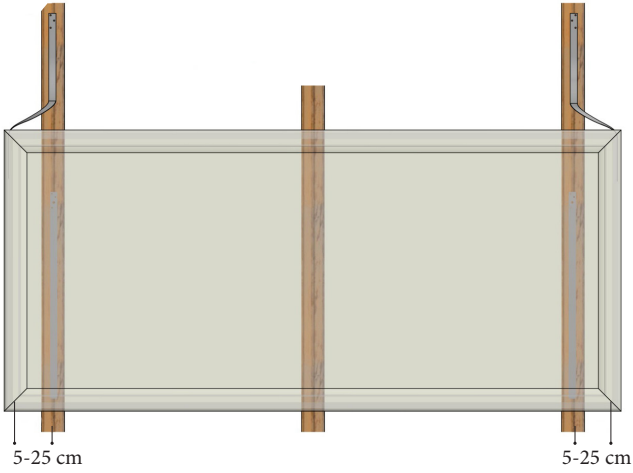


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INSTALLATION PHASE (SLOPED ROOF)

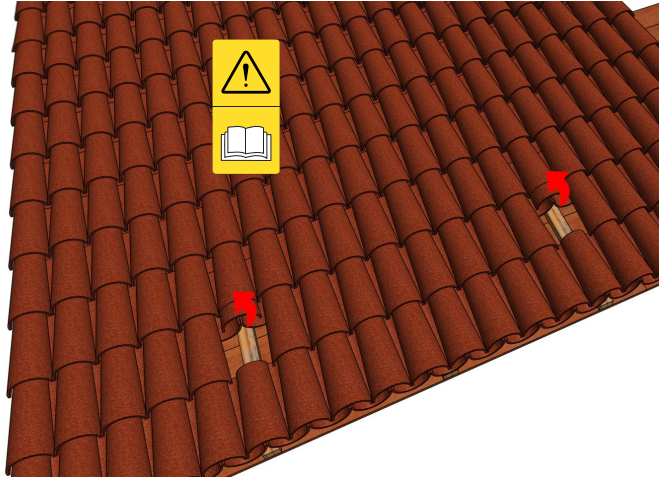
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	SNOW LOAD		WIND LOAD	
	1,2	kN/m ²	100	Km/h



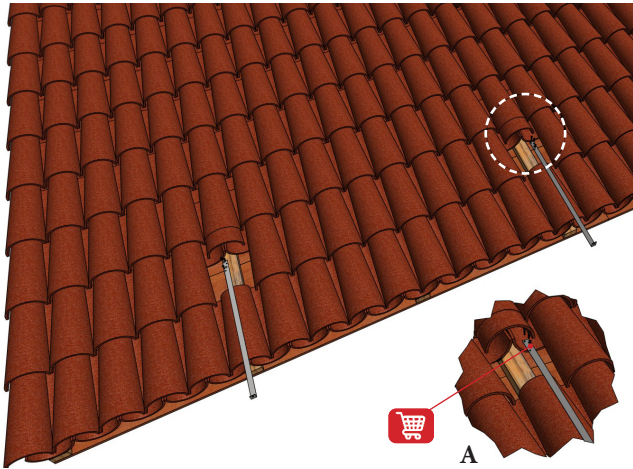
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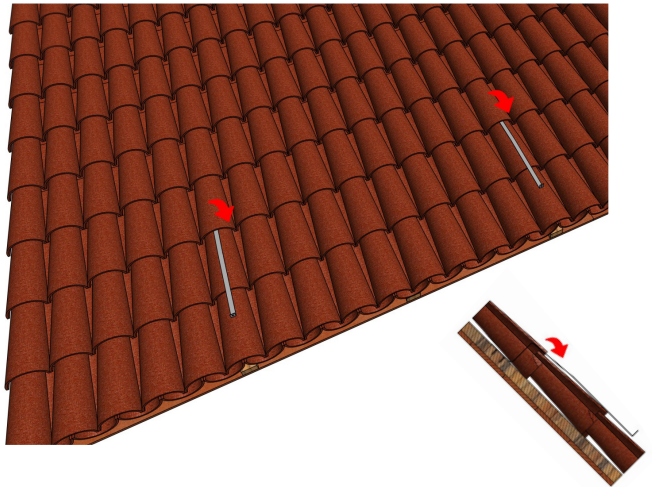
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INSTALLER

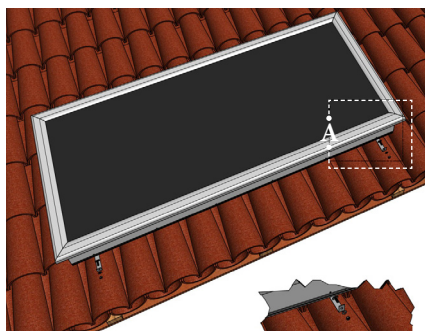
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MAINTENANCE TECHNICIAN

5



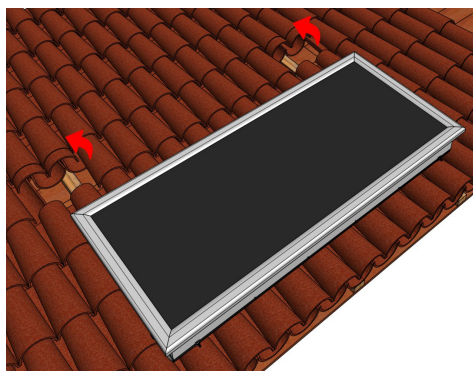
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A

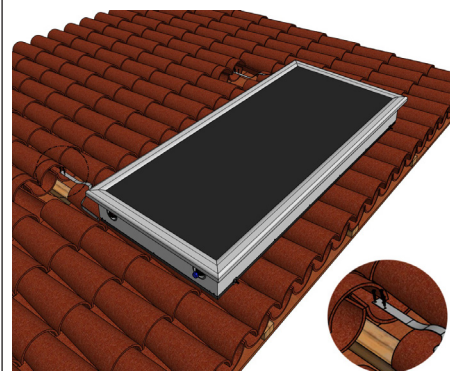
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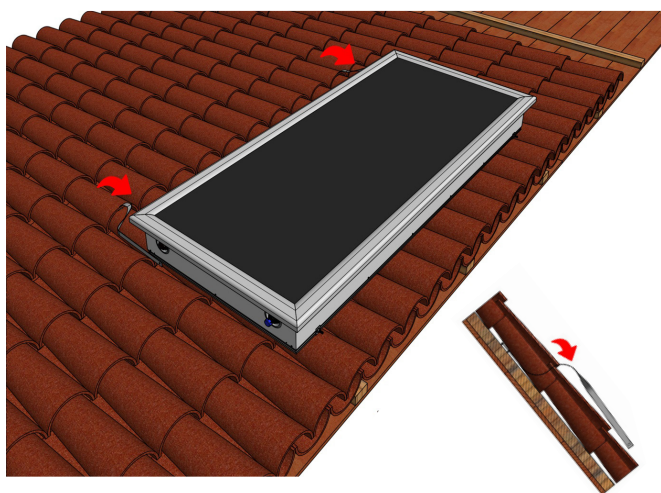
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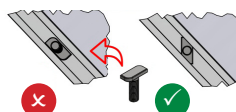
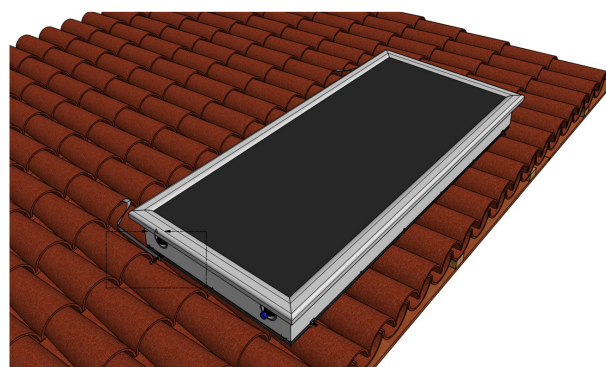
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7g

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13



7h

1.9 INDICATIONS ON GASKETS AND CONNECTIONS

The external components of the SOLARSMART solar collector with integrated storage are all made of plastic, to reduce thermal dispersion.

The connections were created for the use of gaskets with flat seal.

Only use the flat washers supplied with the collector and the valves to seal the connections.

Do not use other types of seal or additional seals, such as hemp, Teflon, sealing paste or similar. No guarantee rights will be recognised if seals or additions other than those supplied are used.

Tighten the fittings with moderation and within the prescribed limits.



When tightening the connections:

- make sure the gaskets are positioned correctly;
- use a spanner and a torque wrench;
- use the spanner to keep one of the two connections steady, so that it does not move from its seat, and to prevent damaging the connection;
- tighten the other connection using the torque wrench, without exceeding a tightening torque of 20 Nm.
- Using flexible hoses

1.10 USING FLEXIBLE HOSES

Only removable connections (e.g. stainless steel bellows and flexible pipes) must be used to connect the water lines to the valves on the solar collector connections.

This compensates the thermal expansion of the lines caused by temperature oscillations and makes disconnecting and repositioning the solar collector easier if it has to be removed.

Make sure the connecting pipes, once installed, can move in order to guarantee suitable thermal expansion.

It is advisable to use a connecting system that is not fixed (e.g. staples).



Other indications

Only use water supply pipes that are suitable for the domestic sector and that can resist a temperature of at least 120 °C.

In order to reduce thermal dispersion and prevent the risk of freezing, it is advisable to insulate the pipes that supply the collector with water and towards the user with insulation material of suitable thickness; for outdoor pipes use material that is UV-resistant.

1.11 ASSEMBLING THE SAFETY AND ONE-WAY VALVE

In order to limit the overpressure of the SOLARSMART system, it is compulsory to install the safety and non-return valves supplied as standard components upstream from the collector.

This solution also prevents the system from emptying in the case of a water shortage from the mains. For the coupling, use the flat $\frac{3}{4}$ " gaskets supplied. For ensuring correct operation of the valve, as well the validity of the warranty of the collector, the aforementioned safety or non-return valves must never be isolated, obstructed or covered. For the correct positioning please refer to the installation diagram in the "Hydraulic connection" section.

This component acts as:

- a safety valve, with opening set at 4.5 ± 0.5 bar;
- a one-way valve, to stop the water from returning to the water system.

If you want to install a discharge valve at inflow (recommended), it should be positioned between the safety valve and the inflow connection.

The safety valve must be installed correctly; if it is not, leaks can occur. In the event of no installation, incorrect installation or use of non-original valves, the manufacturer will not recognise any warranty claims.



The valve is supplied as a standard component with the collector. If it has been misplaced or lost contact the supplier and only ever use original valves.



1.12 ASSEMBLING THE SAFETY UNIT (AN ALTERNATIVE TO THE SAFETY VALVE - OPTIONAL)

For installations in Italy and in countries where a regulation similar to the one established by Ministerial Circular no. 829571 of 26 March 2003 regarding accumulation water heaters:

"...these devices must be connected to the domestic water system using a hydraulic safety unit. This unit must include at least one interception tap, a one-way valve, a control device for the one-way valve, a safety valve, a hydraulic charge interrupting device, all accessories necessary for using the water heaters safely. The design, production and operation criteria of the hydraulic safety units are those defined by the European Commission Regulation EN 1487:2002...", the supplied safety and one-way valve is not suitable and must be replaced with a safety unit that complies with the above standard.

The supplied valve only answers the EN 1717 regulation defined in section 5.4 of the EN 12976-2 regulation.

To comply with the above, the installer can decide to install the individual devices listed above, or can install the SAFETY AND NON-RETURN UNIT available as an accessory on request (code 3.029918), as with the other valves.

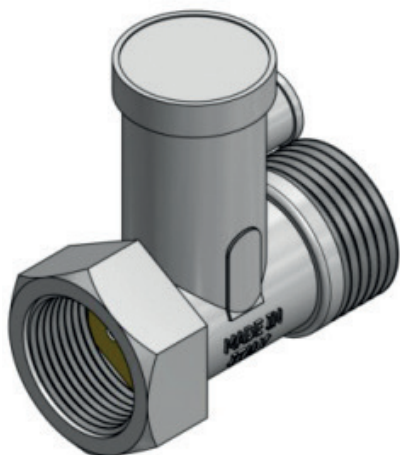
It includes a valve body, with MF $\frac{3}{4}$ " connections, that contains several elements:

- the safety and outflow valve, set at 4.5 ± 0.5 bar;
- the one-way valve, with control device (can be inspected, self-cleaning);
- the device for interrupting the hydraulic load;
- the stopcock;
- an adjustable outflow trap.

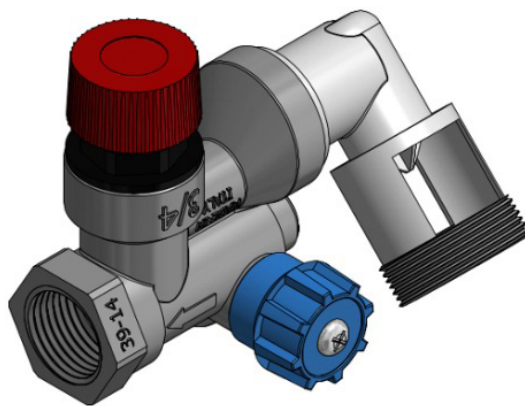
DANGER!

Do not assemble the safety system together with the safety and one-way valve.

Installing the safety system is an alternative to using the safety and one-way valve (standard supplied).



8



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1.13 POSITIONING AND FIXING THE BACKFLOW PREVENTER

The SOLARSMART solar collector with integrated storage is protected from negative pressures by a backflow preventer (or air feed valve) that is assembled on the outflow connection.

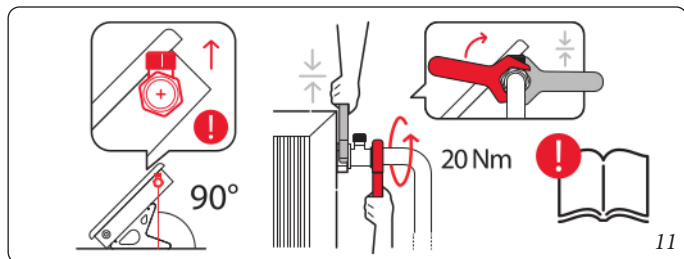
This valve comes already pre-installed but it needs to be correctly orientated and anchored by the installer.

For the coupling, use the pair of flat $\frac{3}{4}$ " gaskets supplied with the collector. For ensuring correct operation of the valve and the validity of the warranty of the collector, the aforementioned bypass valve must never be isolated, obstructed or covered. For the correct positioning please refer to the installation diagram in the "Hydraulic connection" section.

For facilitate this operation, read the instructions supplied with the product.

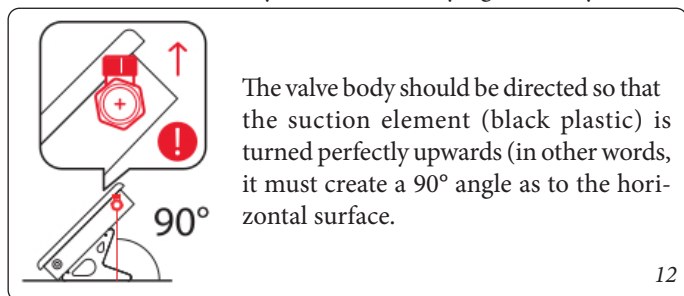


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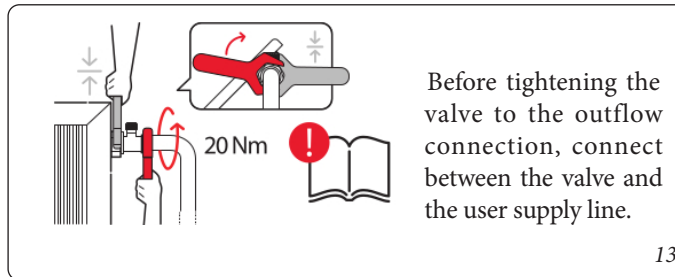
11

A flat $\frac{3}{4}$ " gasket is placed between the valve and the outflow connection in the factory; the valve is only tightened by hand.



12

The valve body should be directed so that the suction element (black plastic) is turned perfectly upwards (in other words, it must create a 90° angle as to the horizontal surface).



13

Before tightening the valve to the outflow connection, connect between the valve and the user supply line.

To do this, keep the plastic connection still using a no. 36 spanner and lock the valve body by tightening the pipe connection. A maximum tightening force of 20 Nm can be applied to the plastic connections and the valve body (it is best to use a torque wrench to avoid exceeding this value).

A valve that is not positioned correctly can easily become clogged or dirty, which results in loss of functionality and leaks. No guarantee rights will be recognised if the previously mentioned valve is not installed or is installed incorrectly.



1.14 PRESSURE REDUCER (OPTIONAL)

It is obligatory to install a PRESSURE REDUCER calibrated to 3 Bar; for the correct positioning please refer to the installation diagram in the "Hydraulic connection" section.

The pressure reducer is available as an accessory (see the "Accessories on request" section)

In case of failure to carry out the proper installation or maintenance, or if the calibration of the pressure reducer is incorrect, the producer will not acknowledge any warranty rights.



14

INSTALLER

USER

MAINTENANCE TECHNICIAN

1.15 EXPANSION VESSEL

The water held in the accumulator of the SOLARSMART solar collector is subjected to notable thermal excursions and, as a result, important variations in volume.

The system is protected from the overpressure caused by these fluctuations by the safety and one-way valve which, if necessary, opens and allows the system to return to its correct working pressure.

Should the user wish to prevent the safety and one-way valve from opening, it is advisable to use an EXPANSION VESSEL, suitably sized according to use.

When the EXPANSION VESSEL is assembled, the overpressure that can originate in the accumulation tank is absorbed by vessel deformation, therefore the safety valve does not need to intervene in normal conditions of use.

The EXPANSION VESSEL must be installed between the safety and one-way valve and the inflow connection of the solar collector. The EXPANSION VESSEL must be connected using all the methods indicated for heating systems, therefore it must be directly connected to the accumulator (without placing valves or taps between them) and pre-set at a pressure of 0.5 bar less than that of the system working pressure.

The EXPANSION VESSEL and its pre-set values must be sized using the normal formulas that can be found in normal hydraulic documents.

The expansion vessel must be installed by specialist technicians and/or companies.

1.16 STARTING

Use of the covering sheet

The SOLARSMART integrated solar collector is supplied with a plasticizer-free PVC covering sheet which serves the purpose of blacking out the surface that captures the solar irradiation. This will prevent the product from overheating from solar exposure in the event of the collector being installed but not connected to the water mains (therefore with no water inside), or in any other situation where the collector volume is wholly or partially empty. The solar collector is not designed for exposure to direct sunlight unless it is filled with water. If to the contrary, the direct irradiation on the empty product will cause overheating and subsequent damage to the internal components.

In the event of using a different sun protection system, make sure that it is plasticizer-free in order to prevent damage to the transparent cover.

The cover sheet must be kept in position from system installation to starting. Do not remove it before having filled the collector.

Exposure to the sun when the system is empty can damage the product; in this case the manufacturer will not recognise any guarantee rights.

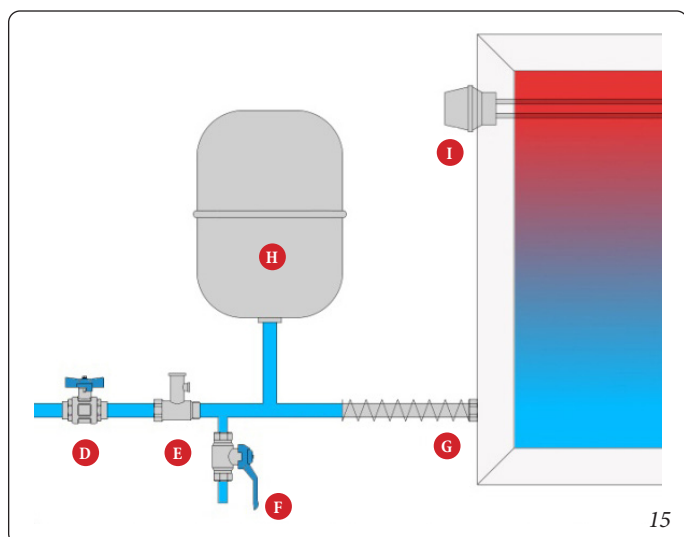


If the solar collector should not be covered at the time of commissioning, cover it with the supplied cover or with a suitable blackout system and wait no less than 3 hours before starting the system loading operation.

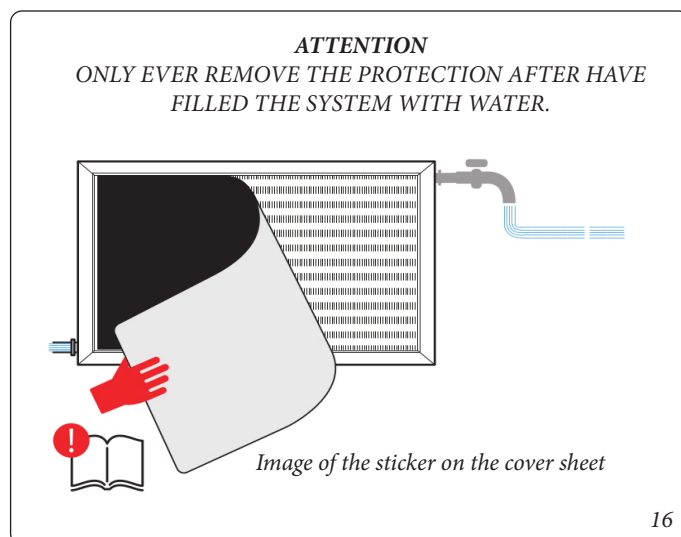
In any case, the system must be charged with the cold system (covered collector or early in the day).

Keep the cover sheet for future use.

If used again, position the sheet carefully, making sure that the smooth grey PVC side is turned towards the outside.



15



16

1.17 START-UP

The start-up consists of the first filling with water after installation. Fill with water within 2 months after installation and in any case only ever remove the covering sheet after the system has been filled and is stably under pressure.

1.18 ALL THE USES EXCEPT START-UP

If it is not possible to cover with the standard sheet supplied, always keep the system primed with water and stably under pressure.

1.19 FILLING

- Connect the cold water supply line (from the mains or a well, etc.) to the inlet connection as indicated in the basic hydraulic connection diagram.

Note: the outlet connection must be free, if a drainage tap for venting the system has been installed upstream from the by-pass valve, this must be opened.

- Open the supply tap and begin to fill the accumulation tank until the water has filled all the cylinders and the air inside has been vented through the outlet connection.

Repeat the filling and venting operations several times, making sure that no bubbles or pockets of air remain inside the accumulation tank. If any air remains inside it could compromise the correct operation of the system and even damage the collector itself.



- Allow the water to flow inside the system for a certain period of time, in order to rinse out any deposits or residues that could have entered the tank during installation. Convey the exiting water down the drain.

In any case, it is recommended not to use the water as “drinking” water for the first two weeks after filling and putting the collector operation.



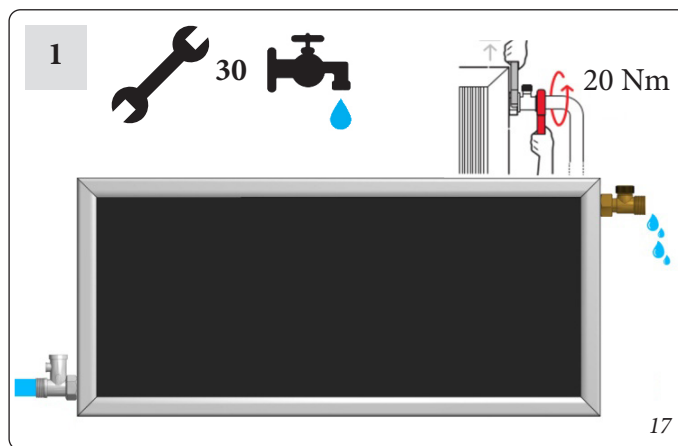
- Close the drainage tap upstream from the cold water inlet and connect the return line to the by-pass valve installed on the outlet connection, as indicated in the basic hydraulic connection diagram.
- Re-open the cold water drainage tap again, check the correct installation of all the safety components and also check that there are no leaks along the supply lines.

Make sure that all the safety components have been installed according to the instructions in the basic hydraulic connection diagram before opening the water supply and putting the system into operation.

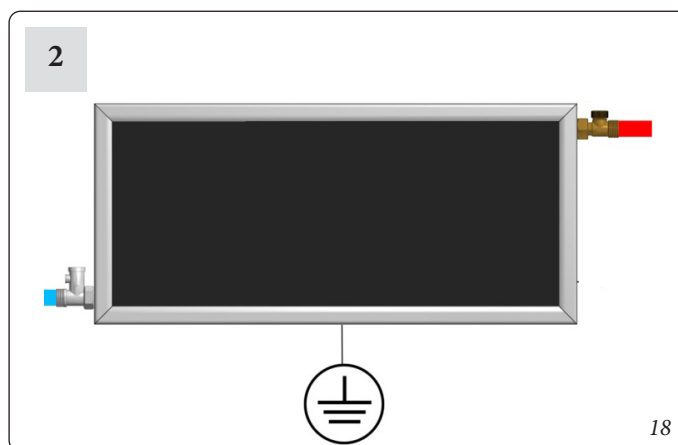


- Lastly, turn on the hot water tap to check the correct supply of water and eliminate any residual air in the supply line of the system.
- After this operation, it will be possible to remove the covering sheet.

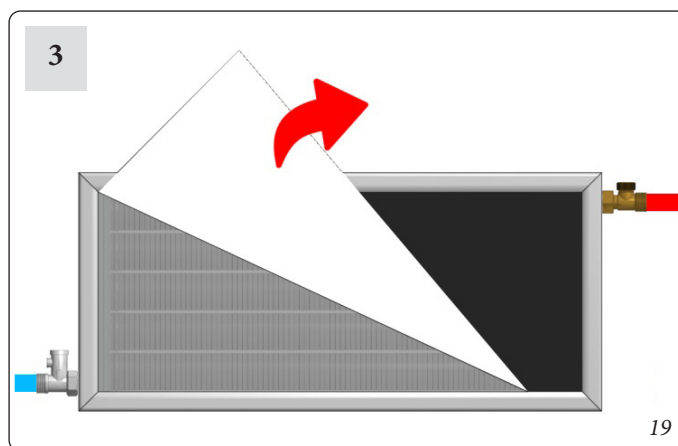
Due to the thermal inertia of the system, the solar collector with integrated SOLARSMART storage will take a few sunny days to go to full capacity. Normally the system will reach temperatures of use after a day of full sun.



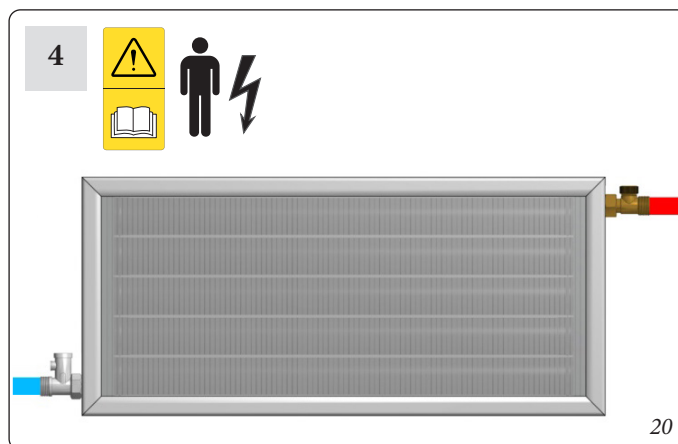
INSTALLER



USER



MAINTENANCE TECHNICIAN




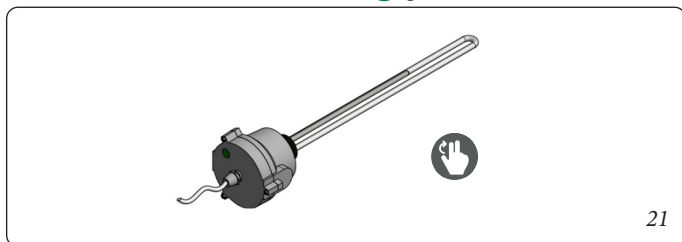
1.20 ELECTRICAL INTEGRATION KIT

Types of electric resistor

Even though the system was designed to operate in temperate zones with good radiation, it has a greater range of uses if combined with ELECTRIC RESISTORS, available as optional accessories to be requested.


THERE ARE 3 TYPES OF RESISTOR AVAILABLE: ANTIFREEZE ELECTRIC RESISTOR (OPTIONAL)

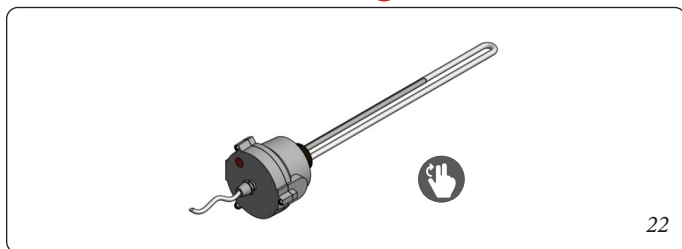
Power: 300 W – 230V/50Hz
Threaded connection: M 1"1/4
Thermostatic operation: ON +5°C / OFF +8°C
Sensitivity: ± 5 °C
Article code: 3.029920
Identification:  green circle



21


ELECTRIC RESISTOR FOR INTEGRATION (OPCIONAL)

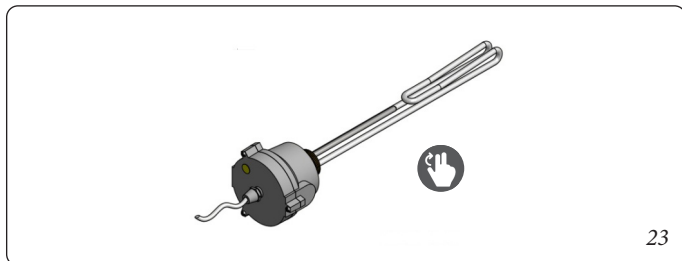
Power: 1000 W – 230V/50Hz
Threaded connection: M 1"1/4
Thermostatic operation: ON +50°C / OFF +55°C
Sensitivity: ± 5 °C
Article code: 3.029921
Identification:  red circle



22

ELECTRIC RESISTOR FOR INTEGRATION (OPCIONAL)

Power: 2000 W – 240V/50Hz
Threaded connection: M 1"1/4
Thermostatic operation: ON +50°C / OFF +55°C
Sensitivity: ± 5 °C
Article code: 3.029922
Identification:  yellow circle



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1.21 INSTALLING THE ELECTRIC RESISTORS

If electric resistors are to be installed after the collector has been started, it must be covered previously with the supplied cover sheet (or with a suitable darkening system) and emptied completely.

- The integration resistor **I** (1 and 2 kW) must be installed in the upper part of the solar collector, opposite the side where the outflow connection is positioned **M**.
- The antifreeze resistor **L** (da 0,3 kW) must be installed in the lower part of the solar collector, opposite the side where the inflow connection is positioned **G**.



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Using a plastic spanner of 1"1/4, unscrew the plastic cap, being careful not to damage it and making sure that the O-ring remains in its seat.

Insert the resistor into the hole and tighten it by hand, without using tools; the structure of the resistor and its connection to the solar collector were designed to avoid their use. Tightening by hand is enough to guarantee system sealing.



Do not use any type of tool to tighten the electric resistor; using tools can damage the sealing thread, resulting in the appearance of leaks. For correct installation, only use the o-ring supplied. In this case, the manufacturer will not recognise any guarantee rights.



Connect the power cable to an electric socket and check the earthing connection.

These accessories can only be connected to the electric power supply by a qualified installer who is authorised to operate in the installation area. The installer must apply all precautions to respect standards, above all those regarding safety, and to eliminate any risk situation.



RISK OF ELECTRIC SHOCK

Do not connect the electric resistors at current values that are different from those given on the plate.



1.22 INDICATIONS ON USING ELECTRIC RESISTORS

The solar collector with SOLARSMART built-in storage can be unlimitedly used, with the exception of the areas at risk of ice. Should the risk of the temperature falling below 0°C be present, the “SOLARSMART” solar collector with integrated storage must be emptied and covered with the PVC cover sheet.

Alternatively, and always with outdoor temperatures of not below -5°C, the antifreeze electric resistor can be installed.

To prevent the formation of ice inside the piping, in addition to the antifreeze electric resistor, we recommend insulating the water supply lines, especially the outdoor sections.

The 1 and 2 kW electric resistors should be used if the “SOLARSMART” solar collector with integrated storage is connected directly to the user, without the addition of a boiler downstream. In periods of less irradiation and colder months, the 1 and 2 kW electric resistances serve as heat integration in order to bring the water temperature in the storage tank to values close to those of use (heating of the top part only).

The electric resistor settings were selected to optimise system duration and operation, and were set in the factory.

Altering these values is considered as tampering with the product, which can cause possible faults and damage; in this case the manufacturer will not recognise any guarantee rights.



To guarantee correct resistor operation and prevent damaging the SOLARSMART solar collector with integrated storage, only the types of electric resistor proposed by the manufacturer can be used. No guarantee rights will be recognised if other types of seals or additions are used.

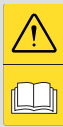


If any antifreeze or integration resistors have been installed, in the event of emptying the collector these must be deactivated.



1.23 TECHNICAL CHARACTERISTICS

SOLARSMART solar collector with integrated storage is used for producing domestic water that is heated by solar power, to temperatures below boiling at atmospheric pressure in places where ice does not form. It is not be used for the integration to the heating of buildings, for the heating of swimming pool and process water.



The system is made up of two integrated units:

A. The solar collector

- The supporting frame of the collectors is made of aluminium profiles.
- The external protective structure is made of a light heat-sealed PVC frame **1**, that resists UV rays.
- The transparent cover is of LEXAN® **2**, a 10 mm twin wall polycarbonate sheet that has been anti-UV treated. In comparison with traditional solar glass, the sheet is 80% lighter, it limits heat dispersion at night, it guarantees optimal transparency to solar radiation and it increases resistance to bad weather.
- The upper frame is made of heat-sealed PVC **3**, that can be removed to access the accumulation tank. Light and UV-resistant, its design makes it suitable for any architectural context.
- The lower thermal insulation is made of a polyurethane foam panel, 30 mm thick, that is coated with sheets of aluminium; the lateral insulation is made of 4 sheets of natural fibre polyester, 25 mm thick.

B. The storage

- The domestic water accumulation system is made of a series of high-performing stainless steel cylinders **4** made of a special alloy that resists high pressures and also very corrosive water.
- The cylinders are closed at their ends by special caps **5** made of thermoplastic material loaded with glass fibre, to unite lightness and resistance.
- The caps are connected to each other by copper connecting pipes, which allow the water to move from one cylinder to the next.

The supports for flat roof **6** available in the following model:

- BASIC SUPPORT: pair of galvanised sheet supports (supplied standard);

Note on the integrated storage system

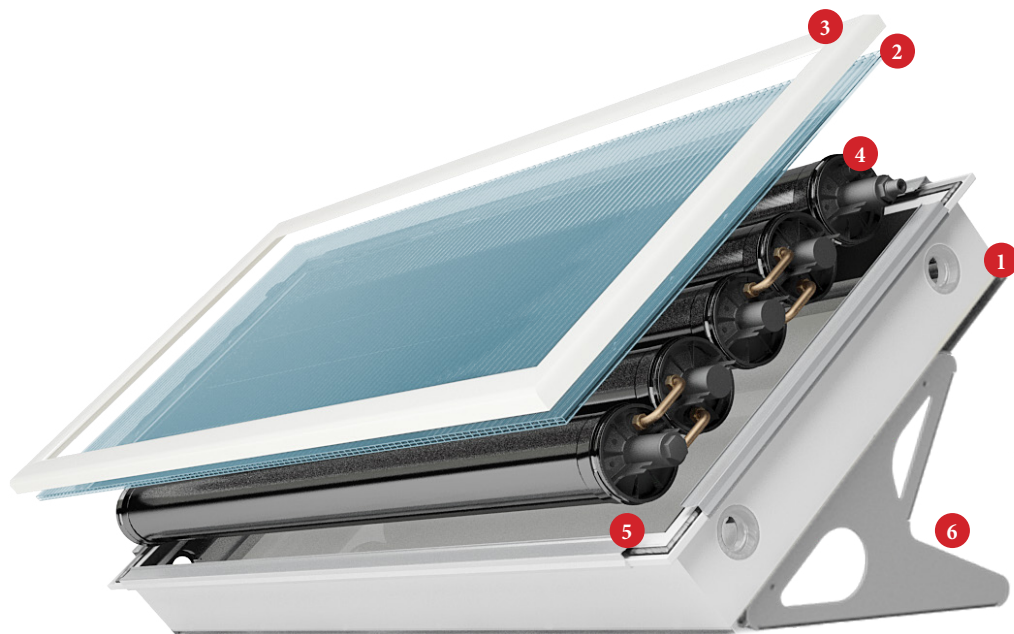
The SOLARSMART solar collector with integrated storage was produced pursuant to the 97/23/EC Directive (PED) for pressurised equipment, in relation to the fluid and working conditions to which it is exposed.

It is a container that holds a group 2 (water) fluid, with steam pressure at the maximum acceptable temperature below 0.5 bar in addition to the atmospheric pressure (1.033 bar).

As its threshold limits are below those indicated in art. 3.3 of Directive 97/23/EC:

- "...for fluids in Group 2 with a pressure PS greater than 10 bar and a product of PS and V greater than 10 000 bar 7L, or with a pressure PS greater than 1 000 bar (Annex II, table 4)...";
- "...piping intended for fluids in Group 2 with a PS greater than 10 bar, a DN greater than 200 and a product of PS and DN greater than 5 000 bar (Annex II, table 9)...". This tank is not subject to CE marking, but the producer guarantees it (as established in the directive) because "designed and produced following a correct construction procedure";

The accumulation system does not require CE marking.



2 OPERATION PRINCIPLES

The SOLARSMART solar collector with integrated storage is a natural circulation solar heating system in which the accumulation tank also acts as an absorber (direct exchange).

The accumulation system is struck directly by the sun's rays, which pass through the transparent cover and transfer their thermal energy directly to the domestic water, which is contained in special steel cylinders.

The accumulator (the volume of which varies according to the selected size) is quickly heated by the sun. The water supply is positioned in the lower part of the system; it heats up as it passes from the lower cylinders to the upper ones and finally exits from the highest cylinder and goes into the system (directly to the user, for preheating a boiler - see "Examples of system layouts" chapter). The special conformation of the tanks means that the incoming COLD water does not mix with the HOT output water, in this way reducing the mixing effects typical of natural and conventional circulation systems.

Water circulation is guaranteed by the network pressure (waterworks, well,...).

When the tap downstream of the system is opened, the hot water exits from the upper section and the same amount of cold water enters the lower section of the system.



2.1 WHEN UNUSED FOR SHORT PERIODS OF TIME

In the event of the SOLARSMART integrated solar collector with accumulation tank not being used for a period of up to 30 days it is possible to leave the plant filled with water and the solar collector uncovered.

Nevertheless, before reusing the hot water it is a good idea to completely empty the tank and then refill it again.

In case of not using the collector for longer periods (e.g. when putting out of service in winter), completely empty the accumulation tank (see below) and cover with the sheet supplied.

2.2 EMPTYING

Whenever it is necessary to empty the SOLARSMART system, for example in case of maintenance or protection against low temperatures, carry out the following steps:

- turn on a tap of one of the users and allow a sufficient amount of water to flow in for lowering the temperature and rinsing out the system;
- close the shut-off valve at the inlet;
- disconnect the return line from the by-pass valve.
- open the drainage tap and convey the outlet water down the drain.

Before the emptying operation, the solar collector must be covered with the sheet supplied or with an appropriate blacking-out system, in order to avoid causing damage to the system by any heat that could form inside due to the absence of water.



If any antifreeze or integration resistors have been installed, these must be deactivated.



ATTENTION:

at the end of its service life, the appliance must not be disposed of like normal household waste nor abandoned in the environment, but must be removed by a professionally authorised company as required by current legislation. Contact the manufacturer for disposal instructions.



INSTALLER

USER

MAINTENANCE TECHNICIAN

SOLARSMART 150|220

HOT WATER OUTLET
(RED CAP)



COLD WATER INLET
(BLUE CAP)



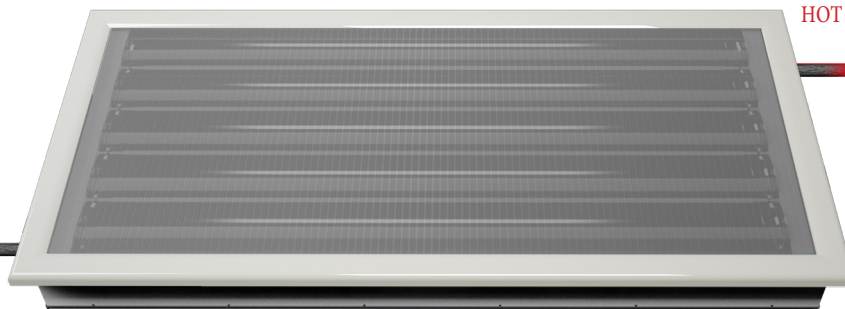
26

SOLARSMART 110|260

HOT WATER OUTLET
(RED CAP)



COLD WATER INLET
(BLUE CAP)

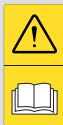


27

3 INSTRUCTIONS FOR MAINTENANCE

3.1 PROGRAMMED MAINTENANCE.

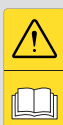
Visually inspect the solar collector with SOLARSMART built-in storage once a year to check for damage, leaks and dirt.



Even programmed maintenance must be carried out by a qualified company; the manufacturer will not recognise any guarantee rights if done by other people.



Periodically check (at least once a year) the correct functioning of the safety and non-return valve and the bypass valve, because in the case of water that is particularly hard and/or has a high impurity content, there could be loss of sealing and jamming of the valve with serious consequences for the integrity of the accumulation tank.



In this case it will be necessary to:

- install a softening or filtration device upstream from the system;
- carry out adequate cleaning and if necessary, replace the valves.

Have the electrical connection of the resistors checked to make sure they are in good condition.

The manufacturer will not recognise any guarantee rights if the “SOLARSMART” solar collector with integrated storage malfunctions because maintenance was not carried out or was carried out badly, in particular on the safety and one-way valve, the backflow preventer and the electric resistors.



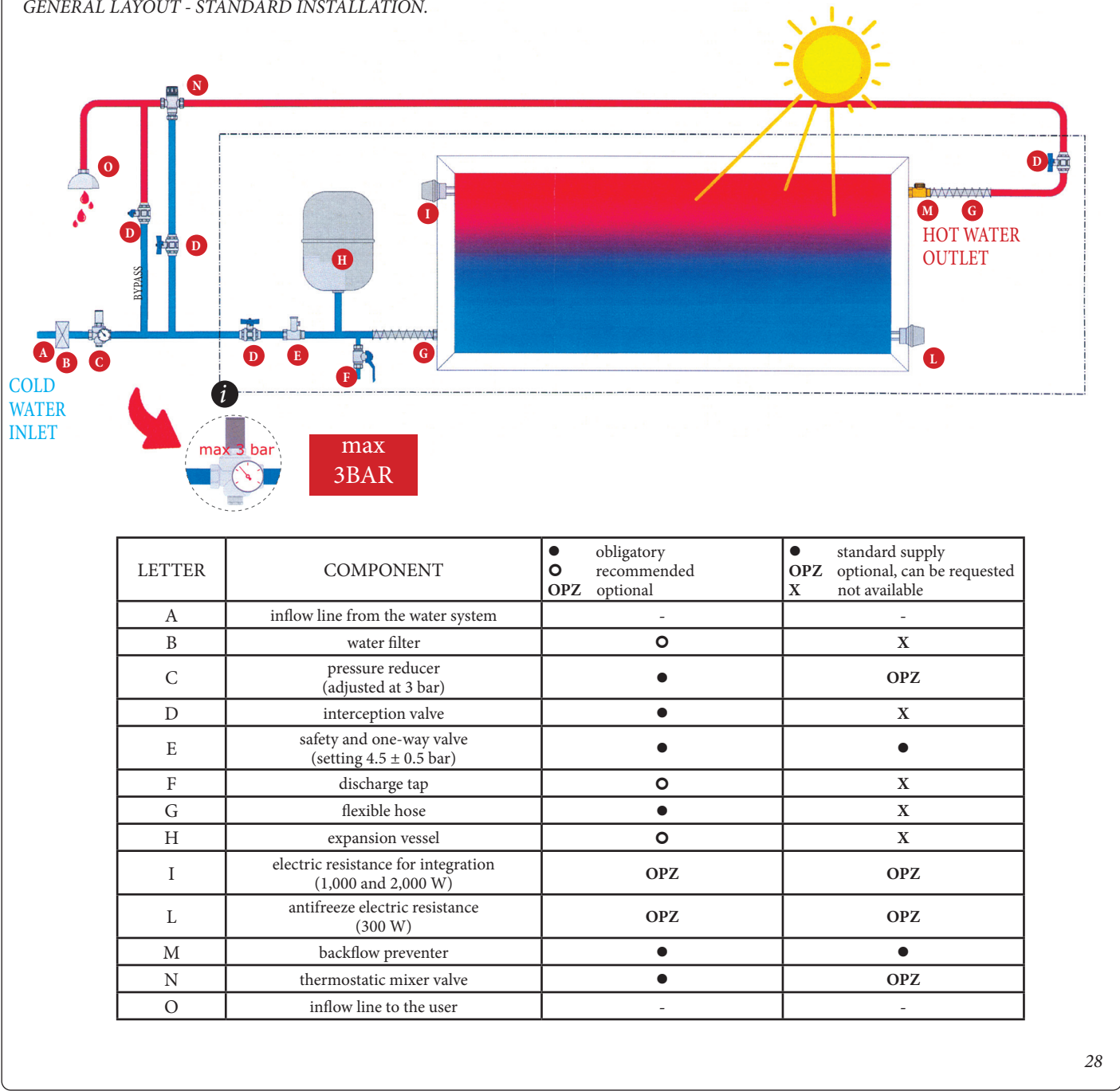
3.2 SOLAR KEYMARK CERTIFICATION.



The SOLARSMART integrated solar collectors have been certified by Solar Keymark according to the test report issued by ENEA, as well as certified by Kiwa Cermet Italia.

3.3 HYDRAULIC CONNECTION MOD. 110/260.

GENERAL LAYOUT - STANDARD INSTALLATION.



The SOLARSMART solar collector with integrated storage is equipped with 2 connections with 3/4" M thread for connection to the line using flat gaskets (supplied). The connection drawing that is represented, just like those on the following pages, is purely indicative and only indicates how to connect the hydraulic connections and install the main supplied components and the requested accessories.

The components surrounded by a broken line, identified by this icon, make up a basic set that is always present in all possible system configurations. For simplicity, these components are not shown in other hydraulic drawings, but their presence is indicated by the relative icon.

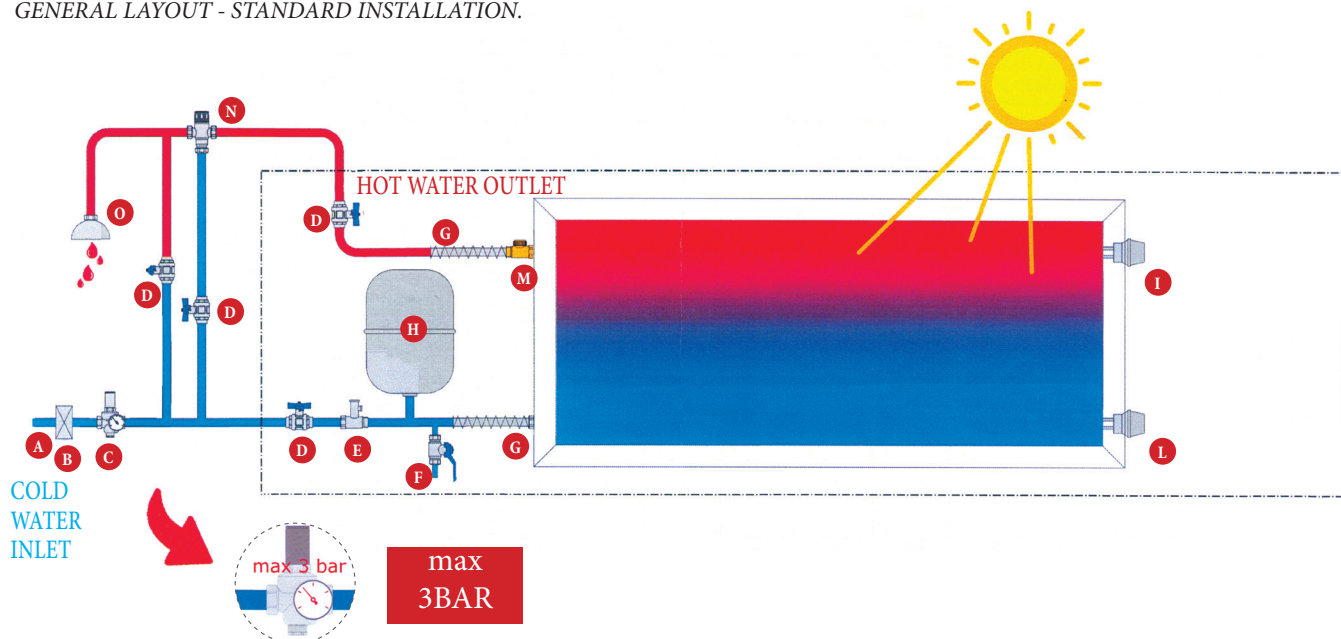


Hydraulic connection is the responsibility of the installer; he/she has the task of verifying if what is indicated in this manual complies with laws and regulations in force at the installation place. The manufacturer is not liable for any damage caused to things and injury to people as a result of installation carried out in a manner that is not state-of-the-art, and without respecting local regulations and laws.



3.4 HYDRAULIC CONNECTION MOD. 150/220.

GENERAL LAYOUT - STANDARD INSTALLATION.



LETTER	COMPONENT	● obligatory ○ recommended OPZ optional	● standard supply OPZ optional, can be requested X not available
A	inflow line from the water system	-	-
B	water filter	○	X
C	pressure reducer (adjusted at 3 bar)	●	OPZ
D	interception valve	●	X
E	safety and one-way valve (setting 4.5 ± 0.5 bar)	●	●
F	discharge tap	○	X
G	flexible hose	●	X
H	expansion vessel	○	X
I	electric resistance for integration (1,000 and 2,000 W)	OPZ	OPZ
L	antifreeze electric resistance (300 W)	OPZ	OPZ
M	backflow preventer	●	●
N	thermostatic mixer valve	●	OPZ
O	inflow line to the user	-	-

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The SOLARSMART solar collector with integrated storage is equipped with 2 connections with 3/4" M thread for connection to the line using flat gaskets (supplied).

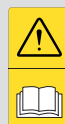
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The components surrounded by a broken line, identified by this icon, make up a basic set that is always present in all possible system configurations. For simplicity, these components are not shown in other hydraulic drawings, but their presence is indicated by the relative icon.



Hydraulic connection is the responsibility of the installer; he/she has the task of verifying if what is indicated in this manual complies with laws and regulations in force at the installation place.

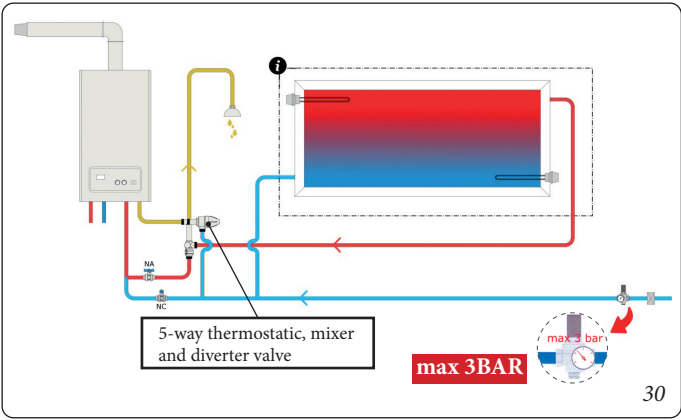
The manufacturer is not liable for any damage caused to things and injury to people as a result of installation carried out in a manner that is not state-of-the-art, and without respecting local regulations and laws.



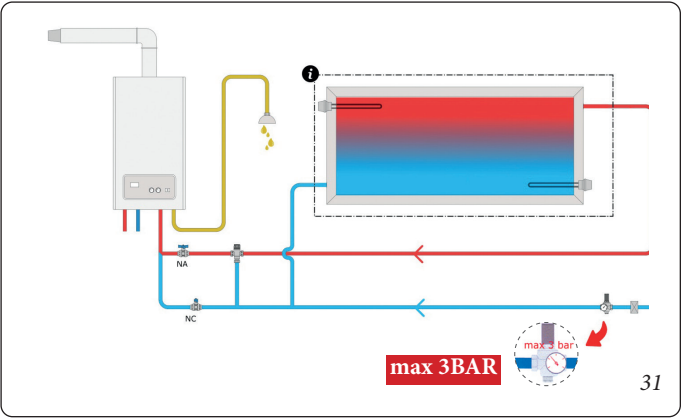
3.5 EXAMPLES OF SYSTEM LAYOUTS

SOLARSMART solar collector collectors with integrated storage can be connected in different ways. Some examples, which are not exhaustive, follow. The technician shall be responsible for evaluating the solution to be implemented.

LAYOUT 1: hydraulic connection to a traditional boiler



LAYOUT 2: hydraulic connection to a boiler prepared for operation with a solar power system.

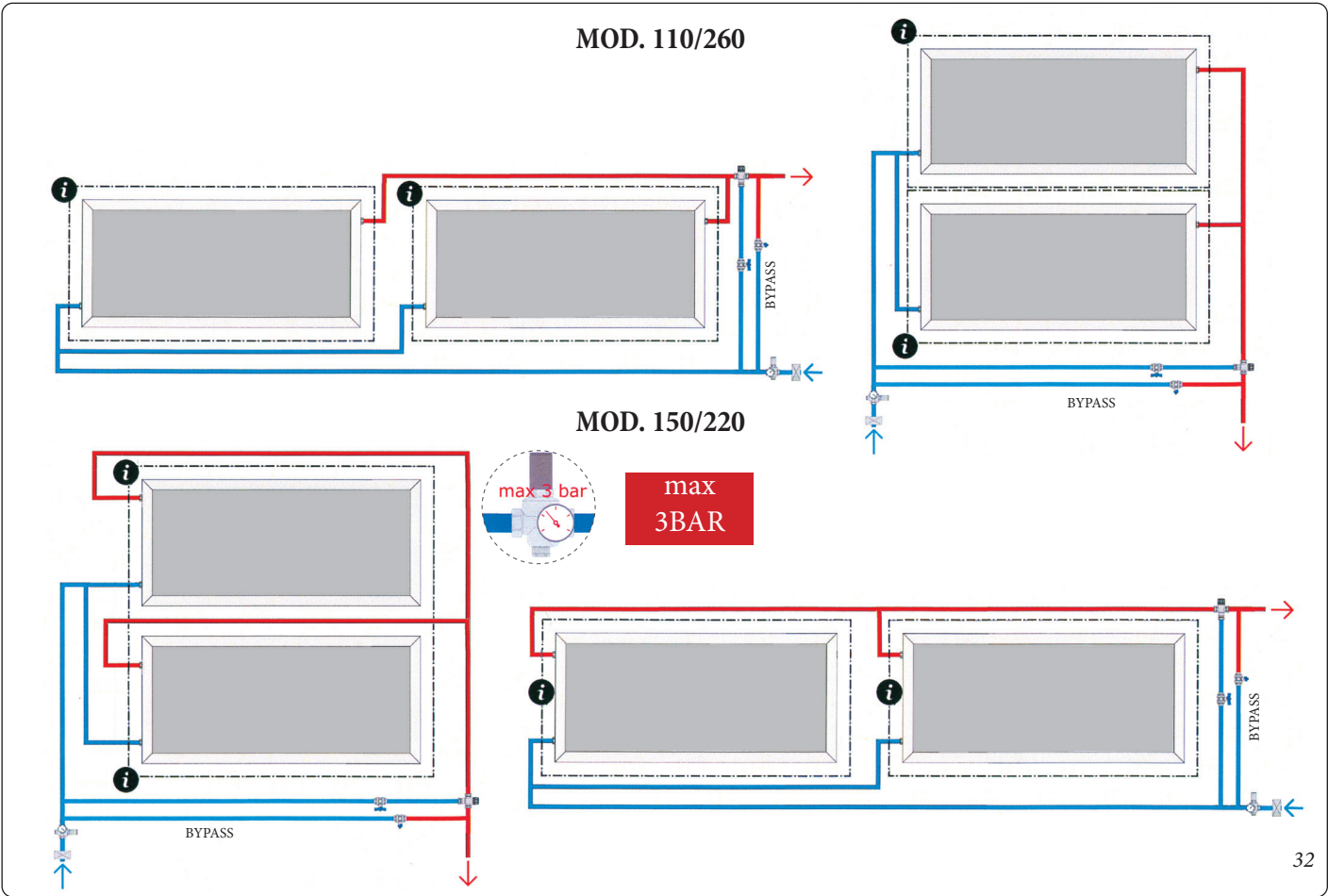


3.6 CONNECTING MORE THAN ONE COLLECTOR.

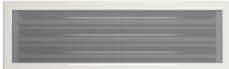


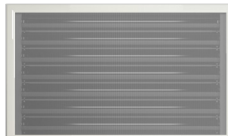




If it is necessary to use several collectors, parallel connection is strongly recommended. The parallel connection must be made in a balanced manner, as shown in the hydraulic diagram and follow.

The components surrounded by a broken line, identified by this icon, make up a basic set that is always present in all possible system configurations. For more details, see the “Hydraulic connection” paragraph.

Do not serial connect two or more SOLARSMART solar collectors with integrated storage. The system was not designed and produced for these applications. Serial connecting the solar collector collectors can cause faults or even damage the product, therefore the manufacturer will not recognise any guarantee rights.



4 TECHNICAL DATA.

MODEL BIANCO LUNARE				
	SOLARSMART 110 3.029661	SOLARSMART 150 3.029663	SOLARSMART 220 3.029665	SOLARSMART 260 3.029667
MODEL ROSSO COPPO	SOLARSMART 110-R 3.029660	SOLARSMART 150-R 3.029662	SOLARSMART 220-R 3.029664	SOLARSMART 260-R 3.029666
External dimensions (L x P x H)	2.136 x 711 x 217mm	2.136 x 906 x 217mm	2.136 x 1.296 x 217mm	2.136 x 1.491 x 217mm
Inclination height 45°(h)	620mm	760mm	1035mm	1170mm
Size of the bracket pitch (B)	2050mm	2050mm	2050mm	2050mm
Gross surface area	1,52 m²	1,93 m²	2,77 m²	3,18 m²
Surface area when open	1,09 m ²	1,48 m ²	2,25 m ²	2,64 m ²
Absorption surface area	0,85 m ²	1,13 m ²	1,69 m ²	1,98 m ²
Effective ACS content	105 liters	140 liters	210 liters	245 liters
Cover requirements	 1-2	 2-3	 4-5	 5-6
Net weight (empty)	36 kg	43 kg	57 kg	65 kg
Working weight (full)	141 kg	183 kg	267 kg	310 kg
Maximum working pressure	400 kPa			
Maximum working temperature	90 °C			
Heat-transfer fluid	ACS			
Hydraulic connections	2 x ¾" M			
Thickness and heat insulation type	30 in PUR (bottom) - 25 in polyester (lateral) [mm]			
Installation	flat roof - sloped roof			
Degree of slope	45° (flat roof) - 15-60° (sloped roof)			
Bleed recommended at 45 °C	-			



This instruction booklet
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