

Installation Instructions

for use by heating contractor

VIESSMANN

Vitosol-F

Models SV, SH

Flat plate solar collectors for sloped roofs, flat roofs, walls and freestanding installation

Please file in Service Binder



VITOSOL-F



Vitosol 100-F
Model SV1B

Vitosol 200-F
Model SV2A



Vitosol 100-F
Model SH1B

Vitosol 200-F
Model SH2A

IMPORTANT

Read and save these instructions for future reference.

Safety, Installation and Warranty Requirements

Please ensure that these instructions are read and understood before commencing installation. Failure to comply with the instructions listed below and details printed in this manual can cause product/property damage, severe personal injury, and/or loss of life. Ensure all requirements below are understood and fulfilled (including detailed information found in manual subsections).

■ Licensed professional heating contractor

The installation, adjustment, service, and maintenance of this equipment *must be* performed by a licensed professional heating contractor.

► Please see section entitled "Important Regulatory and Installation Requirements".



■ Product documentation

Read all applicable documentation before commencing installation. Store documentation near boiler in a readily accessible location for reference in the future by service personnel.

► For a listing of applicable literature, please see section entitled "Important Regulatory and Safety Requirements".



■ Advice to owner

Once the installation work is complete, the heating contractor must familiarize the system operator/ultimate owner with all equipment, as well as safety precautions/requirements, shut-down procedure, and the need for professional service annually.

■ Warranty

Information contained in this and related product documentation must be read and followed. *Failure to do so renders warranty null and void.*



■ Grounding/Lightning protection of the solar system

In the lower part of the building, install an electrical conductor on the piping system of the solar circuit in compliance with local regulations. Connection of the solar system to a new or existing lightning protection or the provision of local grounding should only be carried out by a licensed professional, who must take into account the prevailing conditions on site.

! CAUTION

Observe maximum load and distance from edge before installing the substructure to the roof. If necessary, consult with a structural engineer to determine if the structure is suitable for installing solar collectors. The collectors must be securely mounted so that the mountings can withstand intense wind conditions and local snow loads.

! CAUTION

Gloves and eye protection must be worn when handling solar panels.

! CAUTION

Solar panel connection pipes and solar heating fluid can become hot enough to cause severe burns. Extreme caution must be taken if panels have been in a stagnant condition (no flow of fluid).

! CAUTION

Avoid scratching or sudden shocks to glass cover of the solar panel.

! CAUTION

Never step on collectors or solder in close proximity to the glass surface of the solar panel.

■ Applicability

Vitosol solar collectors are designed for use in closed loop heating systems for domestic hot water heating, space heating and pool heating via a heat exchanger. The use of Viessmann heat transfer medium "Tyfocor-HTL" is strongly recommended.

IMPORTANT

Pool water or potable water cannot be pumped directly through the Vitosol collectors. Damage to collectors caused by corrosion scaling or freeze damage will void warranty.

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Important Regulatory and Installation Requirements

Codes

The installation of solar heating systems might be governed by individual local rules and regulations for this type of product, which must be observed. The installation of this unit shall be in accordance with local codes. Always use latest editions of codes.

Mechanical room

Ensure the mechanical room complies with the requirements of the system design guideline and/or technical data manual.

The solar storage tank must be installed in a mechanical room which is never subject to freezing temperatures. If not in use and danger of freezing exists in the mechanical room, ensure water in tank is drained.

Working on the equipment

The installation, adjustment, service, and maintenance of this equipment must be done by a **licensed professional heating contractor** who is qualified and experienced in the installation, service, and maintenance of solar heating systems. There are no user serviceable parts on this equipment.

Ensure **main power** supply to equipment, the heating system, and all external controls has been **deactivated**. Take precautions in both instances to avoid accidental activation of power during service work.

Technical literature

Literature applicable to all aspects of the Vitosol:

- Technical Data Manual
- Installation Instructions
- Start-up/Service and Operating Instructions
- System Design Guidelines



CAUTION

Carefully read this manual prior to attempting installation. Any warranty is null and void if these instructions are not followed.

This product must be installed observing not only the necessary product literature (see list), but also all local provincial/state plumbing and building codes, as they apply to this product and all periphery equipment.


For information regarding other Viessmann System Technology componentry, please reference documentation of the respective product.


We offer frequent installation and service seminars to familiarize our partners with our products. Please inquire.

→ *The completeness and functionality of field supplied electrical controls and components must be verified by the heating contractor. These include pumps, valves, air vents, thermostats, temperature and pressure relief valves, etc.*

→ *Leave all literature at the installation site and advise the system operator/ultimate owner where the literature can be found. Contact Viessmann for additional copies.*


About these Instructions

 Take note of all symbols and notations intended to draw attention to potential hazards or important product information. These include "WARNING", "CAUTION", and "IMPORTANT". See below.

 **WARNING**

Indicates an imminently hazardous situation which, if not avoided, could result in substantial product/property damage, serious injury or loss of life.

→ Warnings draw your attention to the presence of potential hazards or important product information.

 **CAUTION**

Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or product/property damage.

→ Cautions draw your attention to the presence of potential hazards or important product information.

IMPORTANT

→ Helpful hints for installation, operation or maintenance which pertain to the product.



→ This symbol indicates that additional, pertinent information is to be found in the adjacent column.



→ This symbol indicates that other instructions must be referenced.

Product Information



Please refer to the Vitosol 100-F and Vitosol 200-F Technical Data Manuals, Part No. 5354 729 and Part No. 5285 622 for complete technical information and product description.
The Technical Data Manuals are available for download at www.viessmann.ca or www.viessmann-us.com.

Vitosol 100-F, Models SV1B, SH1B
Vitosol 200-F, Models SV2A, SH2A
Flat plate solar collector

| | |
|-----------------------------|---|
| Absorber area | 25 ft. ² / 2.3 m ² |
| Max. stagnation temperature | 385 °F / 196 °C |
| Max. operating pressure | 87 psig / 6 bar |

Notes on Installation

- The entire solar heating system should be installed in accordance with the accepted rules of technology, observing all relevant accident prevention regulations.
- Employ suitable safety measures to prevent falls, falling objects and roof damage due to insufficient load bearing capacity, e.g. by means of scaffolding, ladders, cable ties etc.
- The collectors must be securely mounted so that the mountings can withstand intense wind conditions.
- Although the glass collectors surfaces are hail-proof, Viessmann recommends users to include storm coverage in their building insurance. Our warranty does not cover storm related damage.
- The collectors should, as far as possible, be oriented towards the south. Solar system performance drops off significantly if collectors face more than 50° off south.
- The collectors should be mounted level, or with a slight ascending slope towards the high point of the piping, so that complete venting of air is assured.
- An air vent valve (c/w shut-off valve) should be installed at the highest point of the solar heating system.
- Filling the solar heating system with Viessmann heat transfer fluid "Tyfocor-HTL" is highly recommended. Tyfocor-HTL is supplied pre-mixed and water must **not** be added. Other heat transfer fluids may be suitable if they have the same temperature range -31°F to 338°F (-35°C to 170°C) and are non-toxic.
- In areas with extremely cold climate conditions, where outside temperatures may drop below -31°F (-35°C), the use of Tyfocor-HTL is not recommended. Use a solar propylene glycol mixture with a higher concentration of glycol that provides the level of freeze protection required for the area of the collector installation.

CAUTION

Use only Viessmann supplied mounting clips and mounting hardware. Never drill or screw directly into collector side frames.

CAUTION

Pool water or potable water cannot be pumped directly through the Vitosol collectors. Damage to collectors caused by corrosion, freeze damage, or scaling will void warranty.

- The piping inside and outside the building should be insulated to avoid heat loss. Use only high temperature resistant pipe insulation.

Collector Location

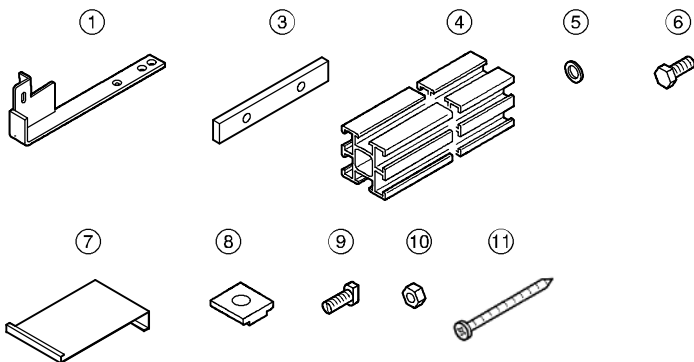


Please refer to the Vitosol System Design Guidelines, for detailed information on the optimum alignment and inclination of solar collectors.

Optimum alignment and inclination

The solar collector provides the highest solar yield over an annual average when facing south with an inclination of approx. 30 to 45 degrees to the horizontal plane. However, the installation of a solar heating system is still viable even when the installation deviates quite significantly from the above (south-westerly to south-easterly alignment, 25 to 55 degrees inclination).

Overview of System Components



Sloped roof mounting hardware

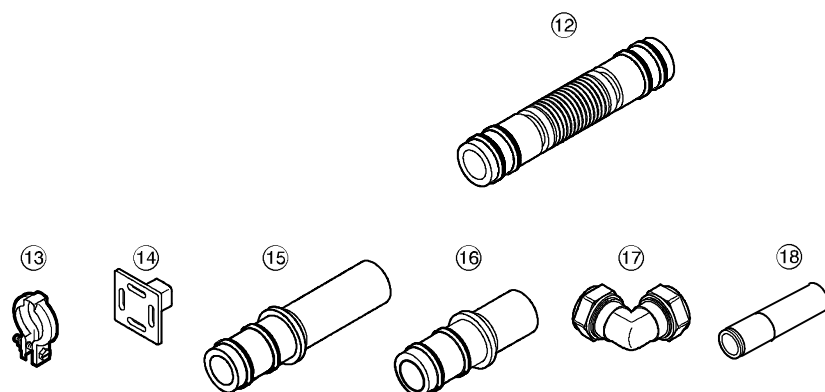
- ① Roof bracket
- ③ Joining element for mounting rail
- ④ Mounting rail, 43 1/4" / 1098 mm or 85 5/8" / 2175 mm
- ⑤ Washer, Ø 1/4" / 8.4 mm
- ⑥ Hexagon bolt, M 8 x 10
- ⑦ Mounting plate
- ⑧ Clamping bracket
- ⑨ Locking bolt w/ threaded stud
- ⑩ Hexagon nut
- ⑪ Stainless steel countersunk screws, 3.1" / 80 mm

Hydronic connection accessories for one panel array

- ⑫ Interconnection pipes (7248 239)

General Connection Set (7248 240) consists of:

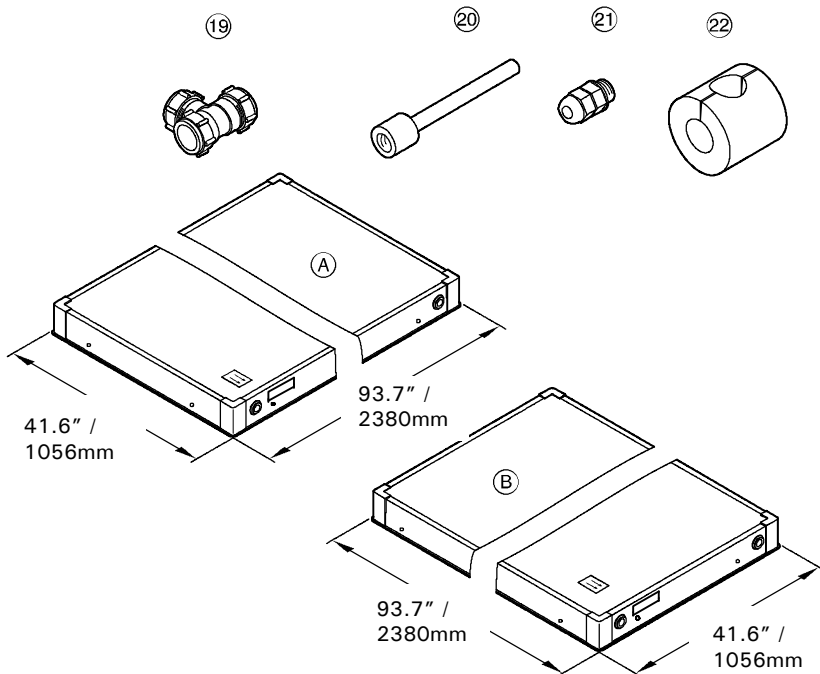
- ⑬ Pipe clip
- ⑭ Mounting rail end cap
- ⑮ Connecting pipe
- ⑯ Plugs
- ⑰ Compression fitting (elbow), Ø 3/4" / 22 mm, 90°
- ⑱ 3/4" x 4" copper adaptor (part of installation fitting set 7427 617)



Accessories for one solar heating system

Sensor Well Set (7174 993) consists of:

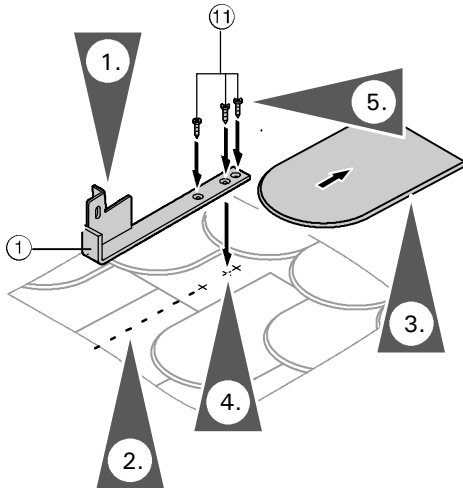
- ⑲ Compression fitting (tee), Ø 3/4" / 22 mm
- ⑳ Sensor well
- ㉑ Strain relief fitting
- ㉒ Insulation



- (A) Collector, Vitosol-F, Model SV1B and SV2A
- (B) Collector, Vitosol-F, Model SH1B and SH2A

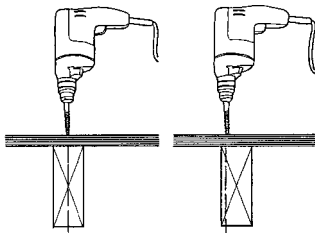
Installing the Mounting Frames

Install the panel array level or slightly inclined (approximately $\frac{1}{2}'' / 10 \text{ mm}$) towards the connection side to ensure complete venting. Always locate an air vent at the highest point in the piping.



Drill within
0.2" / 5 mm
of center

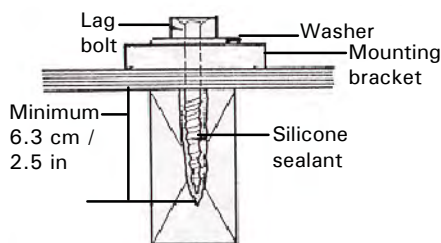
Too close
to edge



Correct

Incorrect

Source: CANSIA



Source: CANSIA

Attaching roof brackets on shingled roof

1. The roof brackets ① should be laid out as close as possible to the dimensions shown in the chart on page 10 for SV collectors, and page 11 for SH collectors.
2. Locate the roof joist by tapping along the roof to find its general location (stud finders do not work well through shingles and roof sheathing).
3. Pry up the shingles and drill small pilot holes to locate exact location of roof joist. If necessary, check where pilot hole is coming through roof from inside of attic.
4. Drill pilot holes into center of joist as shown. Fill the pilot holes and coat the bottom of roof bracket with silicone sealant.
5. Attach bracket to roof joist using the supplied 3.1" stainless steel screws ①. Screws should penetrate the roof joist at least $2\frac{1}{2}'' / 64 \text{ mm}$. Use longer (field supplied) screws if required to achieve necessary penetration.

CAUTION

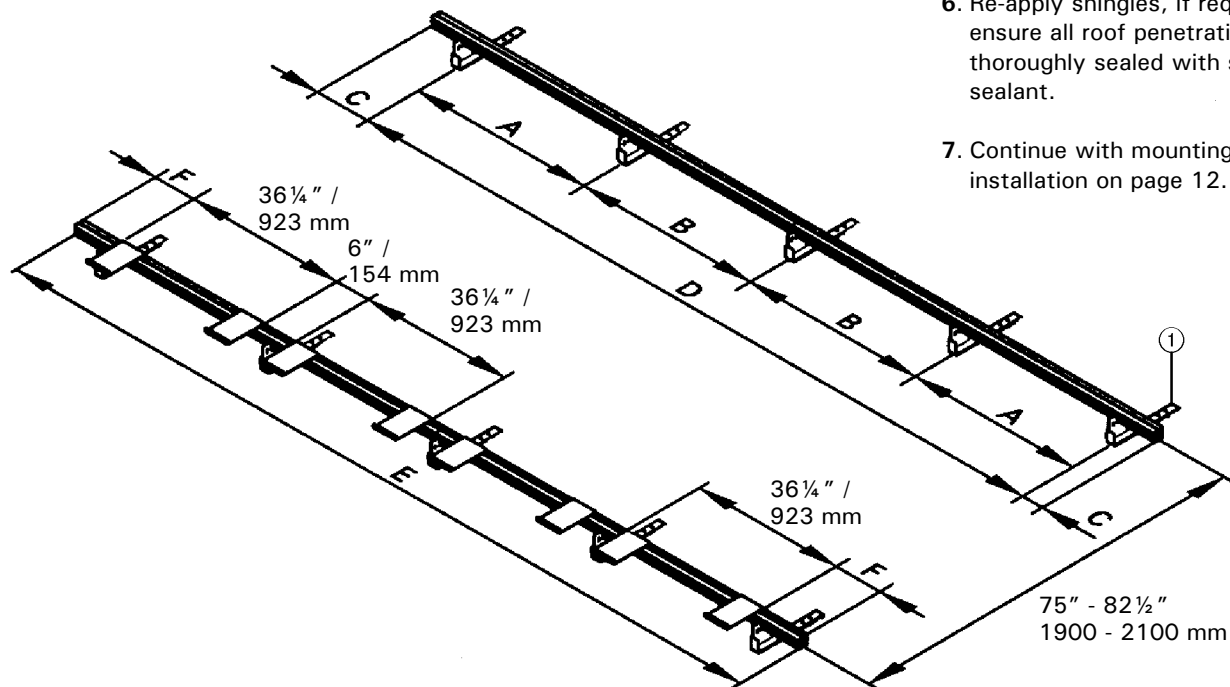
The roof bracket must be securely attached to the roof joist of the structure. Only use stainless steel attachment screws.

CAUTION

The 3.1" / 80 mm screws supplied with the mounting kit may not be sufficient length for some roof structures. The installer must ensure screws will penetrate roof joist sufficiently, and if not, must provide longer screws or lag bolts.

Installing the Mounting Frames *(continued)*

Installation dimensions for ten Vitosol-F, Model SV collector panels



6. Re-apply shingles, if required, and ensure all roof penetrations are thoroughly sealed with silicone sealant.

7. Continue with mounting rail installation on page 12.

Dimensions for Model SV collectors

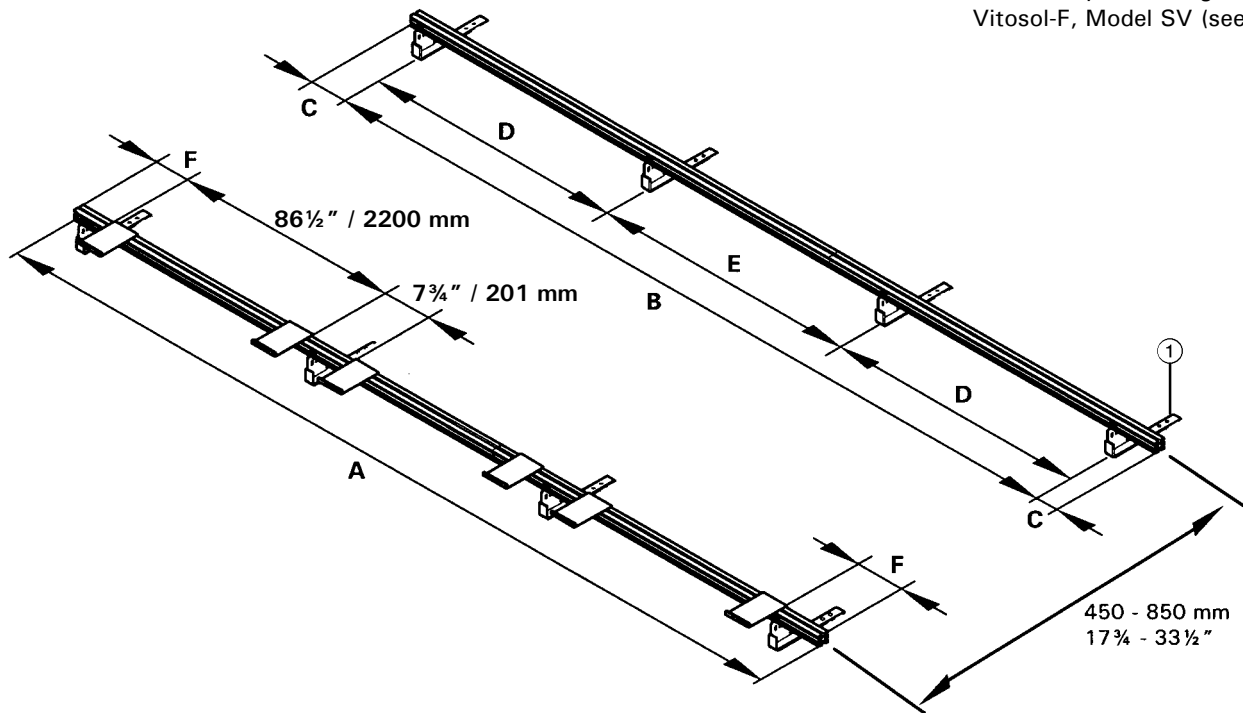
| Number | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 10 |
|----------------------|--------|------|-------|-----------|-------------|-------------|-------------|-------------|-------------|
| Dim. A | mm | 1019 | 1019 | 1019 | 1019 | 1019 | 1019 | 1019 | 1019 |
| | inches | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Dim. B | mm | — | — | 1077 | 1077 | 1077 | 1077 | 1077 | 1077 |
| | inches | — | — | 42½ | 42½ | 42½ | 42½ | 42½ | 42½ |
| Dim. C | mm | 39.5 | 68.5 | 79 | 79 | 89.5 | 89.5 | 100 | 110 |
| | inches | 1½ | 2¾ | 3 | 3 | 3¼ | 3½ | 4 | 4½ |
| Dim. D* ¹ | mm | 1019 | 2038 | 3115 | 4192 | 5269 | 6346 | 8500 | 10654 |
| | inches | 40 | 80¼ | 122½ | 165 | 207½ | 249¾ | 334½ | 419½ |
| | | A | A + A | A + B + A | A + 2xB + A | A + 3xB + A | A + 4xB + A | A + 6xB + A | A + 8xB + A |
| Dim. E | mm | 1098 | 2175 | 3273 | 4350 | 5448 | 6525 | 8700 | 10875 |
| | inches | 43¼ | 85½ | 128¾ | 171¼ | 214½ | 256¾ | 342½ | 428 |
| Dim. F | mm | 87.5 | 87.5 | 98 | 98 | 108.5 | 108.5 | 119 | 129.5 |
| | inches | 3½ | 3½ | 4 | 4 | 4¼ | 4¼ | 4¾ | 5 |

*¹ For static reasons, maintain the stated sequence. Maintain the dimensions A and B as far as possible. Roof brackets may also be offset if you need to locate roof joist. However, always maintain the overall dimension.

Installing the Mounting Frames *(continued)*

Installation dimensions for ten Vitosol-F, Model SH collector panels

8. Follow steps 1 through 7 from Vitosol-F, Model SV (see page 9).



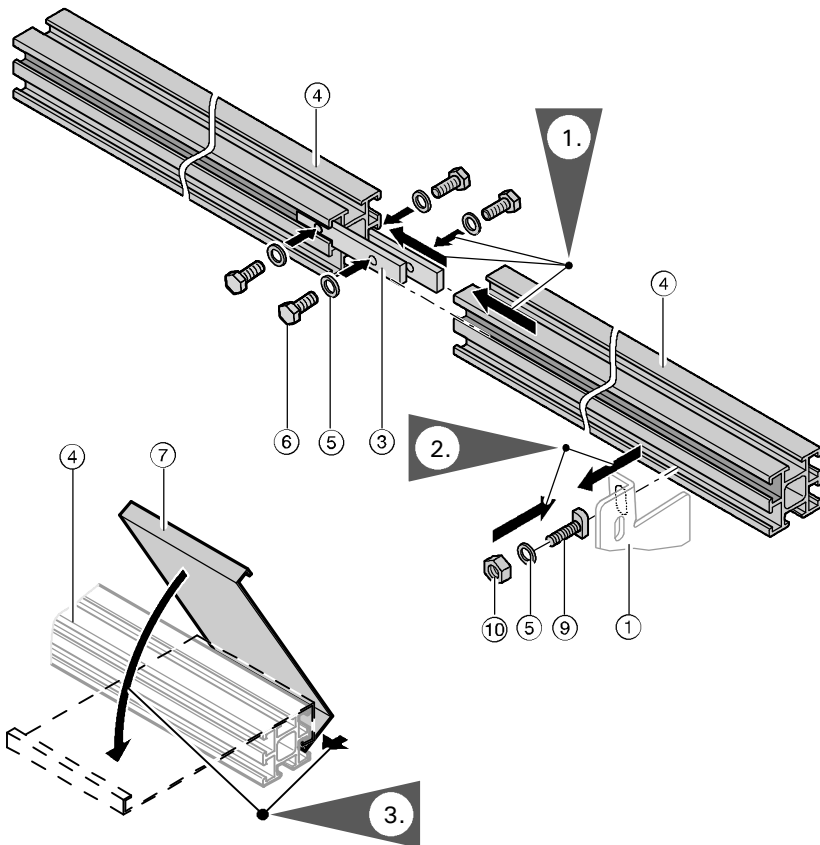
Dimensions for Model SH collectors

| Number | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 10 |
|----------------------|--------|--------|--------|-----------|-------------|-------------|-------------|-------------|-------------|
| Dim. A | mm | 2422 | 4844 | 7266 | 9688 | 12110 | 14532 | 19376 | 24220 |
| | inches | 95 1/4 | 191 | 286 1/4 | 381 1/2 | 476 3/4 | 572 | 763 | 953 1/2 |
| Dim. B | mm | 2250 | 4500 | 6901 | 9302 | 11703 | 14104 | 18906 | 23708 |
| | inches | 88 1/2 | 177 | 271 1/2 | 366 | 460 1/2 | 555 | 744 1/2 | 933 1/2 |
| | | | D + D | D + E + D | D + 2xE + D | D + 3xE + D | D + 4xE + D | D + 6xE + D | D + 8xE + D |
| Dim. C* ¹ | mm | 86 | 172 | 182.5 | 193 | 203 | 214 | 235 | 256 |
| | inches | 3 1/2 | 6 3/4 | 7 1/4 | 7 1/2 | 8 | 8 1/2 | 9 1/4 | 10 |
| Dim. D | mm | 2250 | 2250 | 2250 | 2250 | 2250 | 2250 | 2250 | 2250 |
| | inches | 88 1/2 | 88 1/2 | 88 1/2 | 88 1/2 | 88 1/2 | 88 1/2 | 88 1/2 | 88 1/2 |
| Dim. E | mm | -- | -- | 2401 | 2401 | 2401 | 2401 | 2401 | 2401 |
| | inches | | | 94 1/2 | 94 1/2 | 94 1/2 | 94 1/2 | 94 1/2 | 94 1/2 |
| Dim. F | mm | 111 | 121.5 | 132 | 142.5 | 153 | 163.5 | 184.5 | 205.5 |
| | inches | 4 1/4 | 4 3/4 | 5 1/4 | 5 1/2 | 6 | 6 1/2 | 7 1/4 | 8 |

*¹ For static reasons, maintain the stated sequence. Maintain the dimensions D and E as far as possible. Roof brackets may also be offset if you need to locate roof joist. However, always maintain the overall dimension.

Installing the Mounting Frames *(continued)*

Installing the mounting rails



Note:
See page 8 for numbered
component description

IMPORTANT

Turn the T-slot bolts 90° for all installation steps.

1. If more than two collectors are being installed, rails must be joined together. Secure the joining elements ③ into the mounting rails ④ with bolt ⑥ and washer ⑤.

IMPORTANT

Make sure the mounting rail profile is as shown. The single slot in the rail must face upwards. Failure to install the mounting rail correctly will not allow proper mounting plate connection.

2. Secure the mounting rails ④ to the roof bracket ① with bolt ⑨, nut ⑩ and washer ⑤. The locking bolt ⑨ must be turned 90°.

IMPORTANT

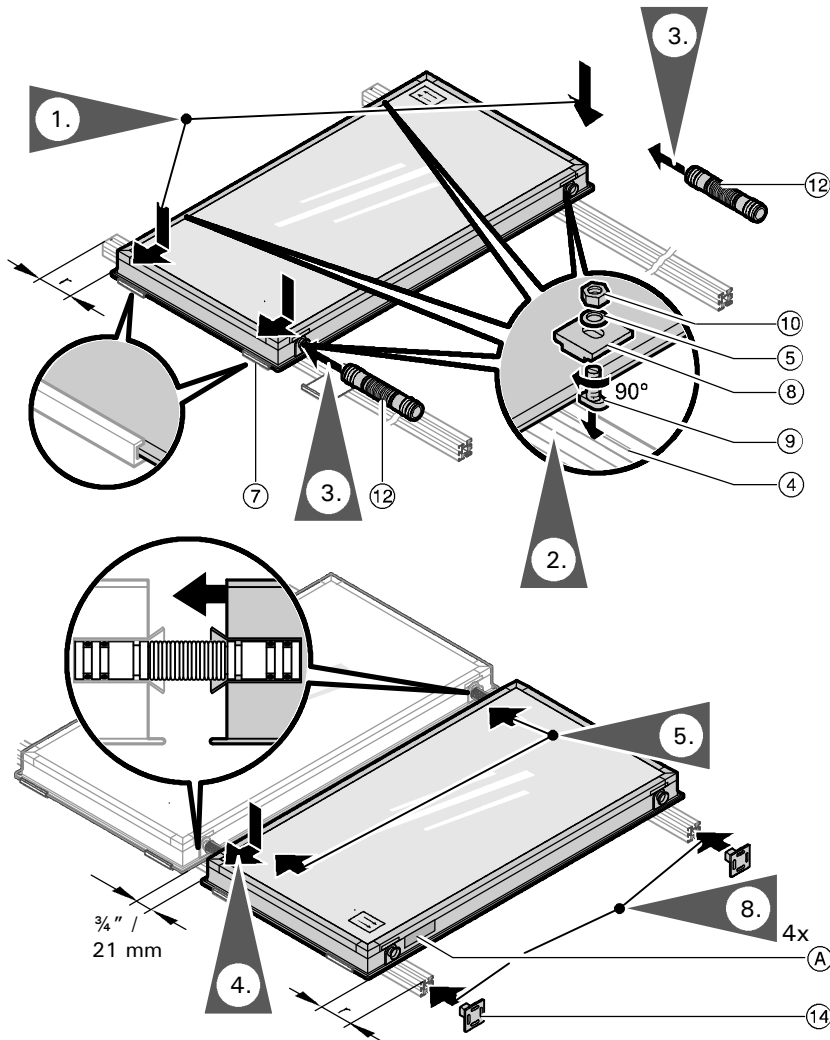
Ensure the upper and lower mounting rails are square before tightening the locking bolts. Measure from opposite corners of the top and bottom rails to ensure that array is square.

3. Hook the mounting plates ⑦ into lower mounting rails ④ according to the dimensions shown in the illustrations on pages 10 and 11.

IMPORTANT

Make sure the mounting plate is installed with the short bent edge connecting onto the bottom of the collector.

Installing the Solar Collectors



(A) Rating plate
(must be on the outside of the
outer collectors)

Note:

See page 8 for numbered component
description

| Number of collectors | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 10 |
|-----------------------------|--------|-----|------|------|------|-----|------|------|-------|
| Dimension r SV collector | inches | 0.8 | 0.8 | 1.2 | 1.2 | 1.7 | 1.7 | 2.1 | 2.5 |
| | mm | 21 | 21 | 31.5 | 31.5 | 42 | 42 | 52.5 | 63 |
| Dimension r SH collector | inches | 0.8 | 1.2 | 1.7 | 2.1 | 2.5 | 2.9 | 3.7 | 4.5 |
| | mm | 21 | 31.5 | 42 | 52.5 | 63 | 73.5 | 94.5 | 115.5 |

CAUTION

Do not stand on the collectors.

IMPORTANT

Interconnecting pipes must be free from damage and contamination. Lubricate all plug-in joints (O-ring seals) on the collectors. Use only the special grease supplied with the connection set.

IMPORTANT

On the first and last collector, the side to which the rating plate is attached must be on the outside (see page 14). Ensure that dimension "r" is maintained for first and last collector.

1. Hook the collector into its mounting plates (7) and lay down onto the mounting rails (4).
2. Secure the collector with four clamping brackets (8) onto the mounting rails. Tighten the two outer clamping bolts only. Turn the T-slot bolt (9) 90°.
3. Before inserting connecting pipe (12) mark the middle of the connecting pipe with a marker or a piece of tape for reference. Insert the connecting pipe into the collector until the brass section is no longer visible.

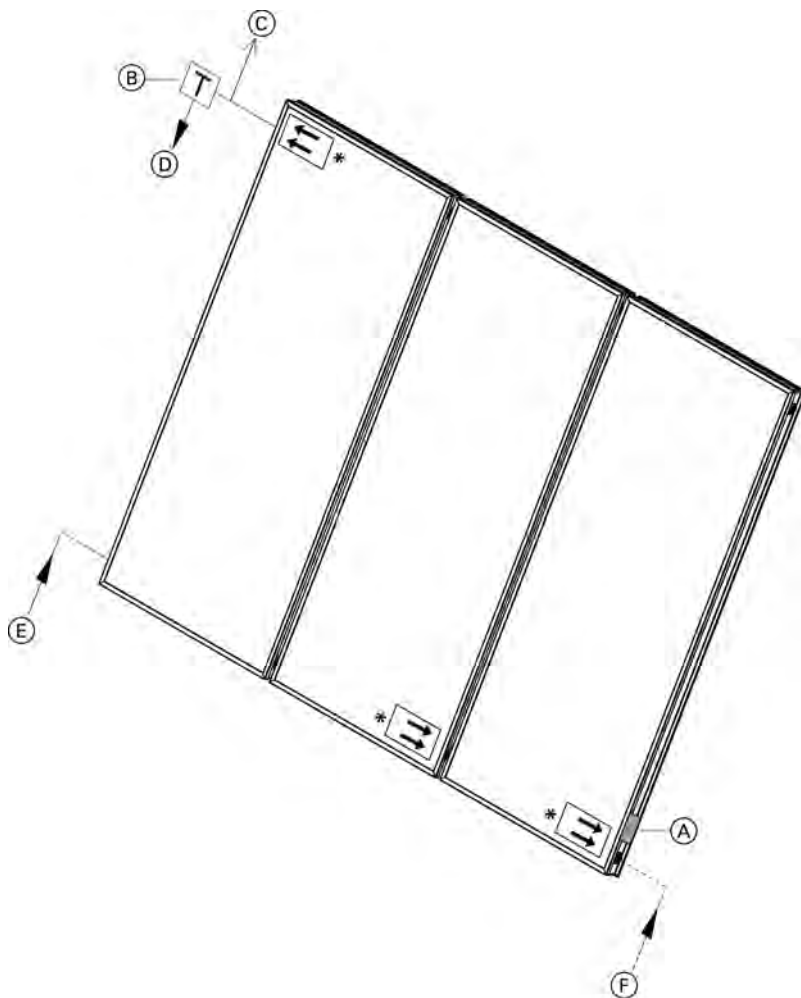
IMPORTANT

Ensure interconnection pipe is centered between collectors.

4. Position the second collector as in step 1.
5. Carefully push the second collector against the first and insert the connecting pipes (12) until they are centered between the collectors. Distance between the two installed collectors should be 3/4" / 21 mm.
6. Install all additional collectors.

Continued on following page.

Installing the Solar Collectors *(continued)*



* Arrow directions are to ensure balanced flow throughout the collectors.

If the collectors are not connected as shown above, it could also result in:

- Collector temperature sensor will not sense the hottest collector temperature
- The fluid flow through the collector array may be imbalanced.
- A decrease of the efficiency of the collectors.

- (A) Rating plate
(must be on the outside of the outer collectors)
- (B) Collector temperature sensor location
- (C) Air vent location
- (D) Supply pipe from collector
- (E) Return pipe to collector
- (F) Alternate location for return pipe from collector

7. Tighten all clamping brackets (5).

8. Press the cover caps (14) (part of the connection set) into the mounting rails.

9. Remove all labels and foil cover from glass only after the system is fully operational.



CAUTION

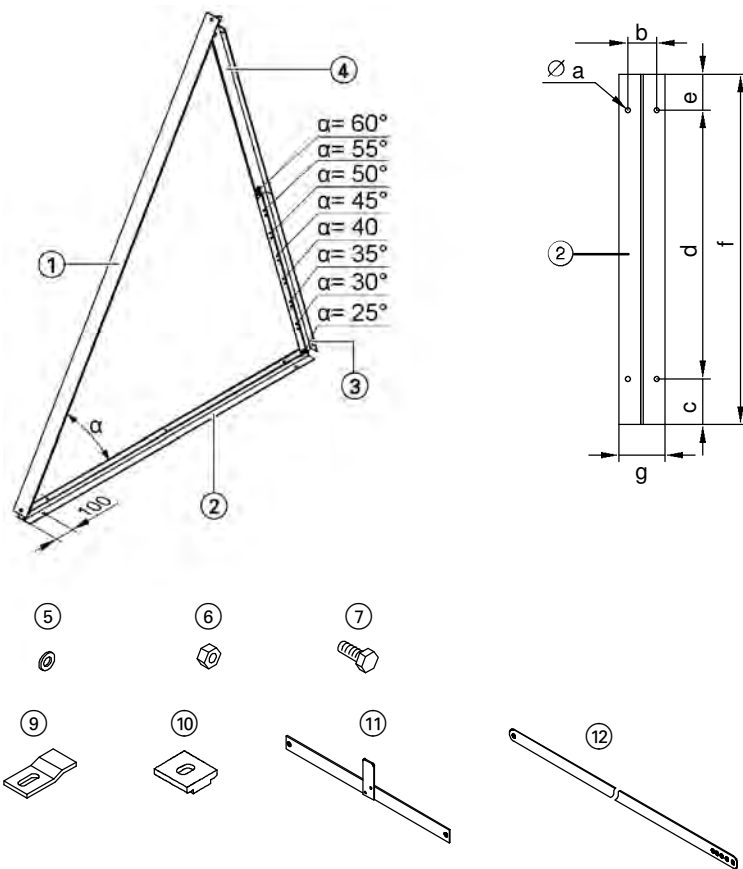
Arrows on the first and last collector in a series must point towards the outside.



CAUTION

Viessmann strongly recommends not removing the cover foil from the collectors until after initial start-up in order to prevent overheating.

Overview of System Components (Vitosol-F, Model SV)



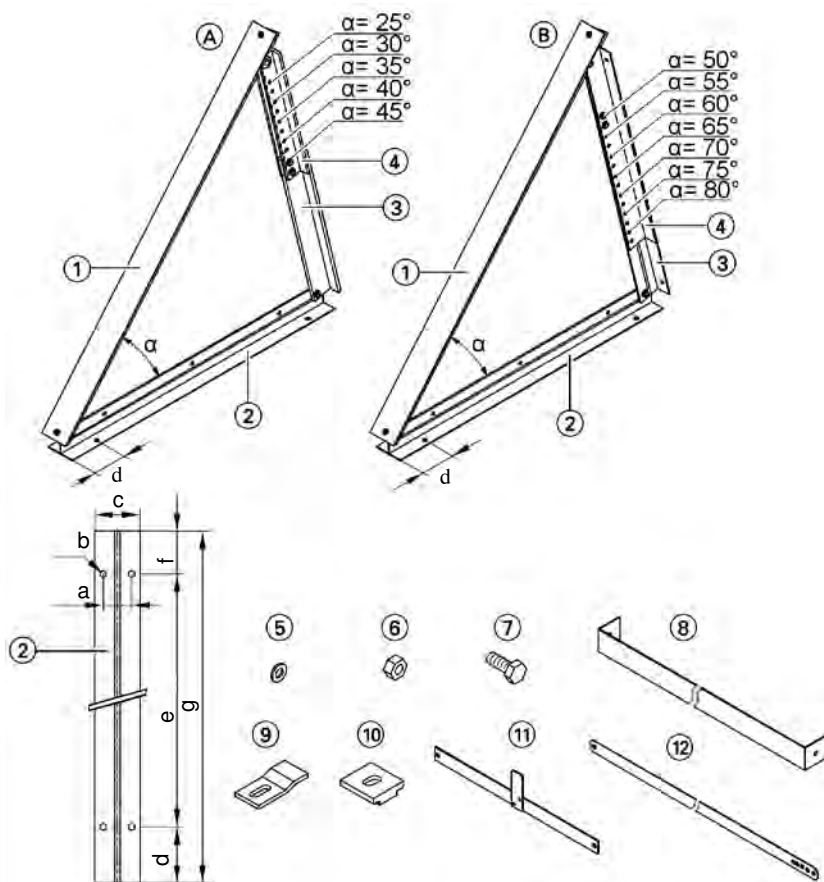
Legend:

- ① Collector support
- ② Cross brace
- ③ Adjustable support, lower part
- ④ Adjustable support, upper part (2-part support)
- ⑤ Washer, $\varnothing 8.4\text{mm}$
- ⑥ Hexagon nut M8
- ⑦ Hexagon bolt M8 x 20
- ⑨ Retaining plate
- ⑩ Clamping bracket
- ⑪ Connecting brace
- ⑫ Connecting tie

Dimensions:

- a $\varnothing 0.4'' / 11\text{mm}$
- b $2'' / 50\text{mm}$
- c $4'' / 100\text{mm}$
- d $63'' / 1600\text{mm}$
- e $4'' / 100\text{mm}$
- f $71'' / 1800\text{mm}$
- g $3'' / 80\text{mm}$

Overview of System Components (Vitosol-F, Model SH)



Dimensions:

- a 2" / 50mm
- b Ø 0.4" / 11mm
- c 3.1" / 80mm
- d 4" / 100mm
- e 28.4" / 722mm
- f 3" / 75mm
- g 35.3" / 897mm

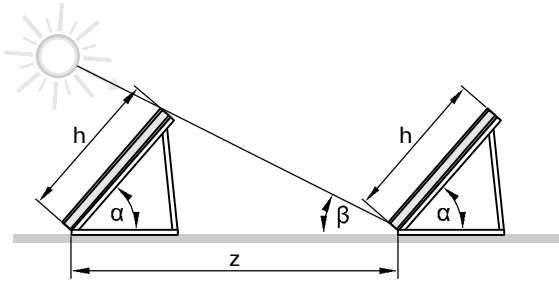
Legend:

- ① Collector support
- ② Cross brace
- ③ Adjustable support, lower part
- ④ Adjustable support, upper part (2-part support)
- ⑤ Washer, Ø 8.4mm
- ⑥ Hexagon nut M8
- ⑦ Hexagon bolt M8 x 20
- ⑧ Ballast support rails (field supplied)
- ⑨ Retaining plate
- ⑩ Clamping bracket
- ⑪ Connecting brace
- ⑫ Connecting tie

Two different versions of the collector support frames are available.

- (A) Collector support, angle of inclination adjustable from α 25° to 45°
- (B) Collector support, angle of inclination adjustable from α 50° to 80°

Determining the Collector Row Distance "z"



$$\frac{z}{h} = \frac{\sin(180^\circ - (\alpha + \beta))}{\sin \beta}$$

Legend:

z = Collector row distance

h = Collector height

α = Collector angle of inclination

β = Solar angle

IMPORTANT

When installing several collectors in series, maintain a distance of "z".

Example:

Model SV

Toronto is located at approx. 43° latitude.

1. Determine the angle of the sun β.
This should be chosen so that the midday sun December 21 falls on the second row of collectors without being obstructed by shadows.

Solar angle β:

$$\beta = 90^\circ - 23.5^\circ - \text{latitude}$$

(23.5° should be accepted as constant value for northern latitudes)

$$\beta = 90^\circ - 23.5^\circ - 43^\circ = 23.5^\circ$$

2. Calculating dimension "z":

h = 2380 mm (for model SH use 1056 mm)

$$\alpha = 45^\circ$$

$$\beta = 23.5^\circ$$

$$z = \frac{2380 \cdot \sin(180^\circ - (45^\circ + 23.5^\circ))}{\sin 23.5^\circ}$$

$$z = \frac{2380 \text{ mm} \cdot \sin 111.5^\circ}{\sin 23.5^\circ}$$

$$z = 5553 \text{ mm} / 218.6"$$

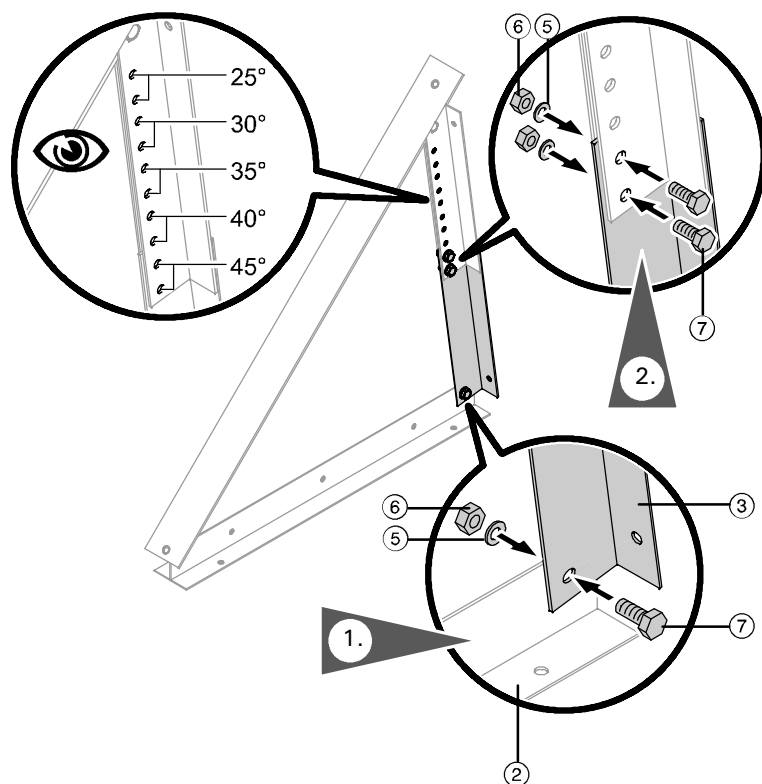


Refer to Vitosol System Design Guide for more information on calculating "z".

Note:

Contact Viessmann Solar Tech Support for assistance with calculating distance "z".

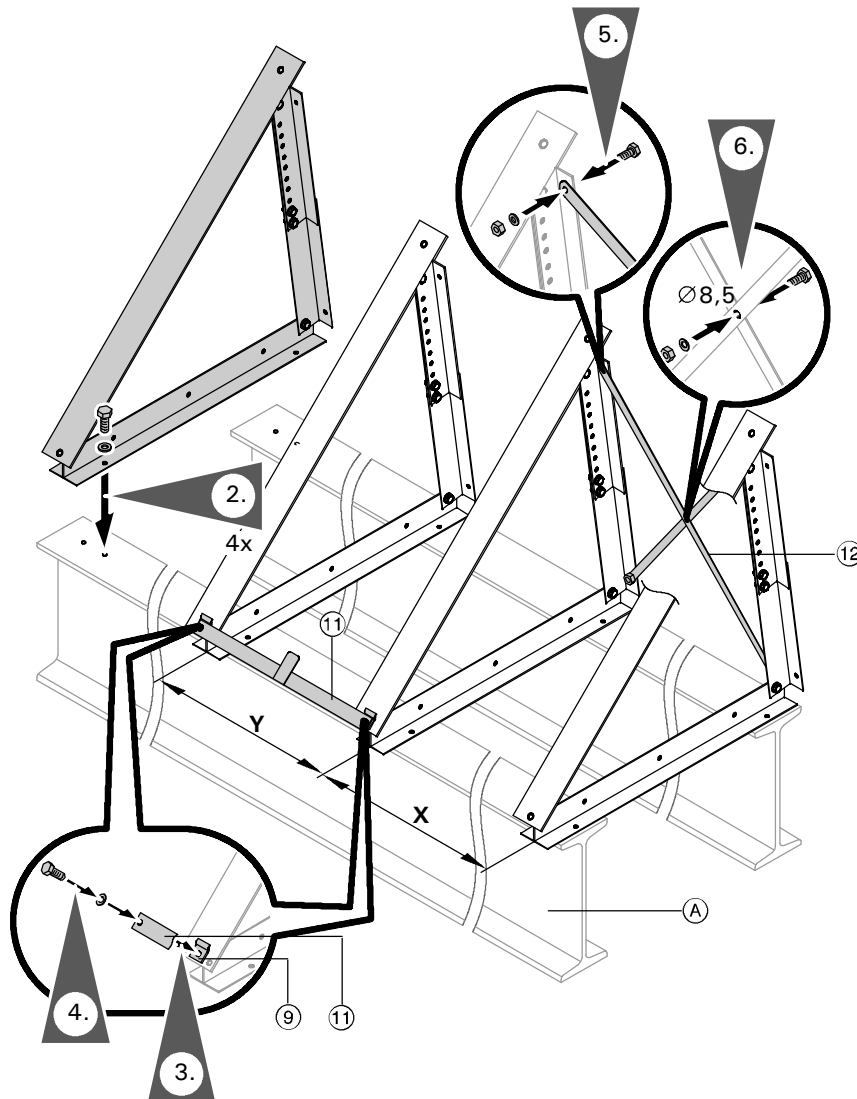
Installing the Collector Supports and Adjustment of the Angle of Inclination α



1. Secure the adjustable support (lower) (3) to the bottom cross brace (2) with bolt (7), nut (6) and washer (5).
2. Secure the upper and lower adjustable supports together with bolts (7), nuts (6) and washers (5), in accordance with the required angle of inclination.

Note:
See page 15 or 16 (depending on model) for numbered component description.

Installing Freestanding Installation (on substructures)



(A) Substructure rails (field supplied)

Note:

See page 15 or 16 (depending on model) for numbered component description.

| Collector model | | X | Y |
|-----------------|--------|------|------|
| SV | inches | 23.5 | 18.9 |
| | mm | 595 | 481 |
| SH | inches | 75.6 | 18.9 |
| | mm | 1920 | 481 |

1. Mount the substructure (to be provided on site), e.g. U-channels, at right angles to and level with the installation orientation of the collectors according to the dimensions shown in the drawing.
2. Position and align the collector support frames according to the dimensions shown in the drawing and secure them to the substructure using stainless steel bolts (supplied by others). Use mounting plates as templates for drilling holes.

CAUTION

Any welds or connections to the existing substructure must be supervised by a professional structural engineer.

3. Secure retaining plates (9) to the bottom of all collector supports; do not tighten screws yet.
4. Secure connecting braces (11) onto the retaining plates between the second and third, the fourth and fifth supports etc. Tighten all screws.
5. Secure two connecting ties (12) diagonally side by side to the adjustable supports, respectively for between one and six collectors.

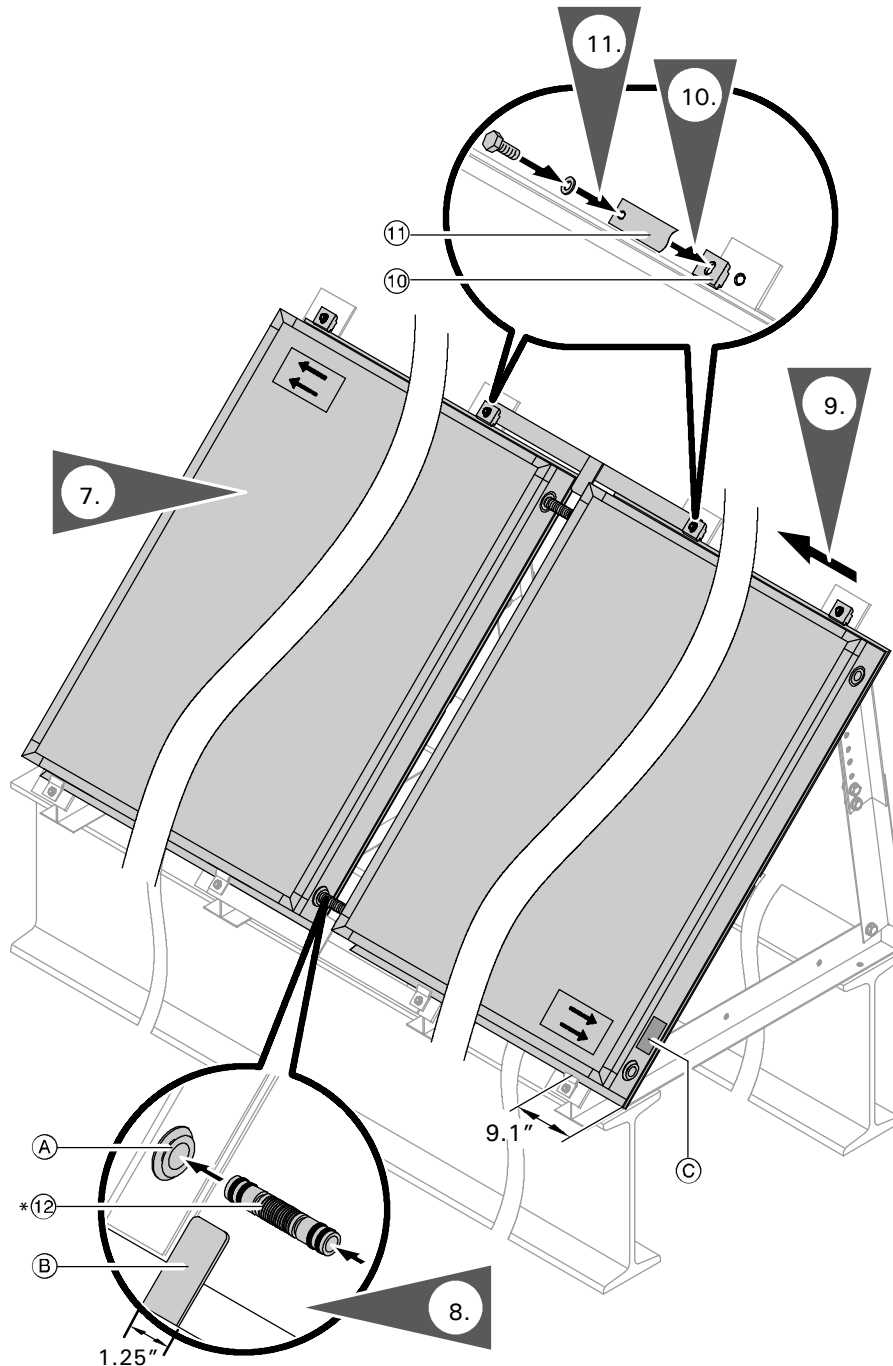
Note:

Only one connecting tie is supplied for 1 to 6 collectors, two connecting ties for 7 to 10 collectors.

6. For added stability, attach connecting ties to each other where they intersect, using field supplied nut and bolt.

Continued on following page.

Installing Freestanding Installation (on substructures)



Legend

- (A) Collector connection
- (B) Spacer lip of the connecting brace
- (11) Rating plate
- (C) Rating plate

Note:

See page 15 or 16 (depending on model) for numbered component description.

* See page 8 for numbered component description.

7. Position the first collector into the retaining plates (9) and push right up to the spacer lip of the connecting brace (11).

IMPORTANT

Install the collector panel so that the rating plate side of the first and last collector is on the outside (note sticker)! If only one collector is to be installed, connect the piping opposite the nameplate side. See page 14 for more information.

8. Before inserting interconnection pipe (12) mark the middle of the connecting pipe with a marker or a piece of tape for reference. Insert the interconnection pipe (12*) into the collector until the brass section is no longer visible.

IMPORTANT

Interconnecting pipes must be free from damage and contamination. Lubricate all plug-in joints (O-ring seals) on the collectors. Use only the special grease supplied with the connection set.

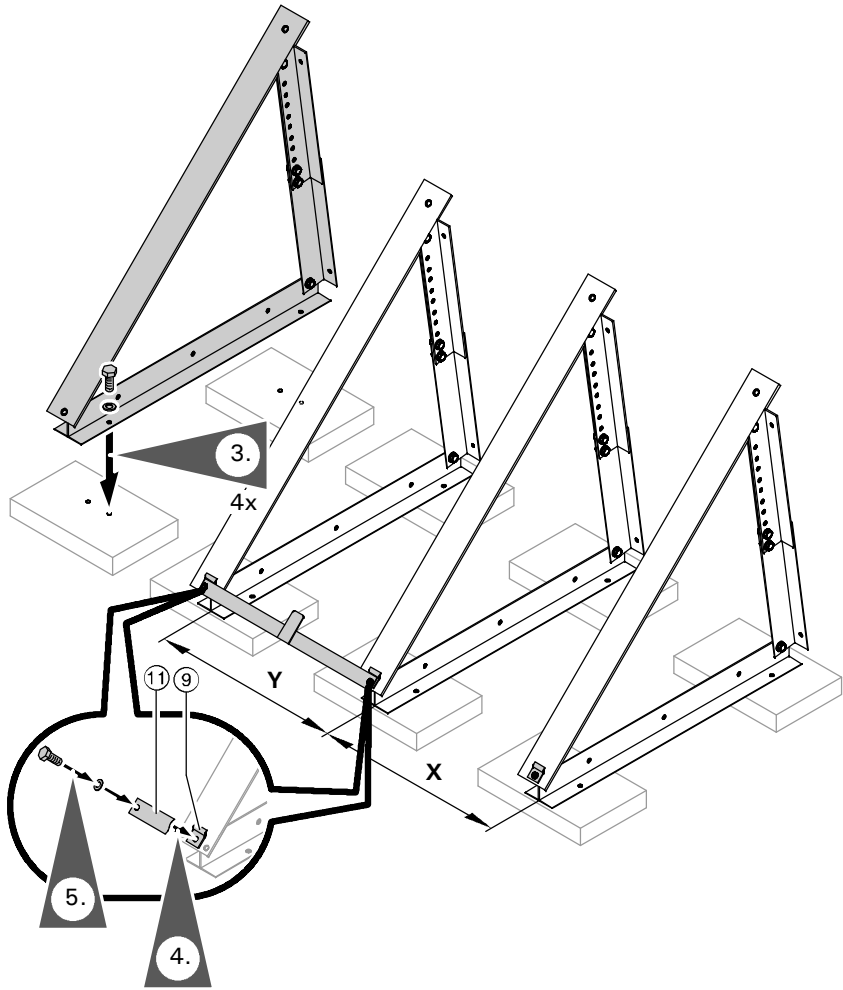
9. Carefully push the next collector up to the spacer lip and insert the interconnection pipes as far as possible until they are centered between the collectors.

IMPORTANT

Ensure interconnection pipe is centered between collectors.

10. Click clamping brackets (10) into the collector edge at the top of all supports.
11. Secure the connecting brace (11) turned by 180° to the next brace using the clamping brackets between the second and third, the fourth and fifth supports, etc.
12. The distance between collectors should be no greater than the width of the spacer lip on the connecting brace (B).
13. Tighten all screws.

Installing a Freestanding Installation (with ballast weight inserts - for Model SH only)



1. Observe the max. load and distance from the edge of the roof for on-site substructure.

CAUTION

A structural engineer must be consulted to ensure that the existing roof structure is capable of carrying the additional weight of the collectors, insert weights and support slabs.

2. Remove any gravel etc. from the installation area, cover the surface with protective building mats or foam insulation and position concrete slabs on top of the mats or insulation.
3. Secure the support cross brace (2) (use as drilling template) onto the concrete slabs (bolts supplied by others).
4. Secure retaining plates (9) to the **bottom** of all collector supports; do not yet tighten screws.
5. Secure connecting braces (11) onto the retaining plates between the second and third, the fourth and fifth supports etc. Tighten all screws.

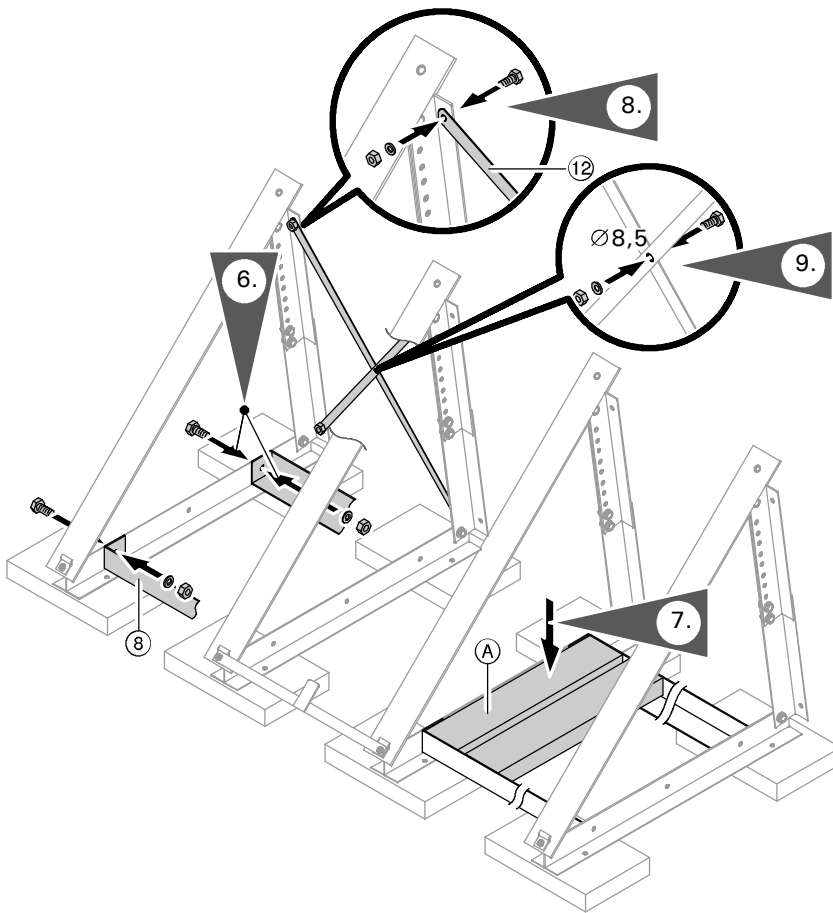
Continued on following page.

| Collector model | | X | Y |
|-----------------|--------|------|------|
| SH | inches | 75.6 | 18.9 |
| | mm | 1920 | 481 |

Note:

See page 16 for numbered component description.

Installing Freestanding Installation (with ballast weight inserts - for Model SH only)



6. Secure the ballast support rails ⑧ (field supplied) between the cross braces. These rails must be based on the size and shape of ballast weights.

7. Apply ballast weights (see table on page 24).

8. Secure two connecting ties ⑫ diagonally side by side to the adjustable supports, respectively for between one and six collectors.

Note:

Only one connecting tie is supplied for 1 to 6 collectors, two connecting ties for 7 to 10 collectors.

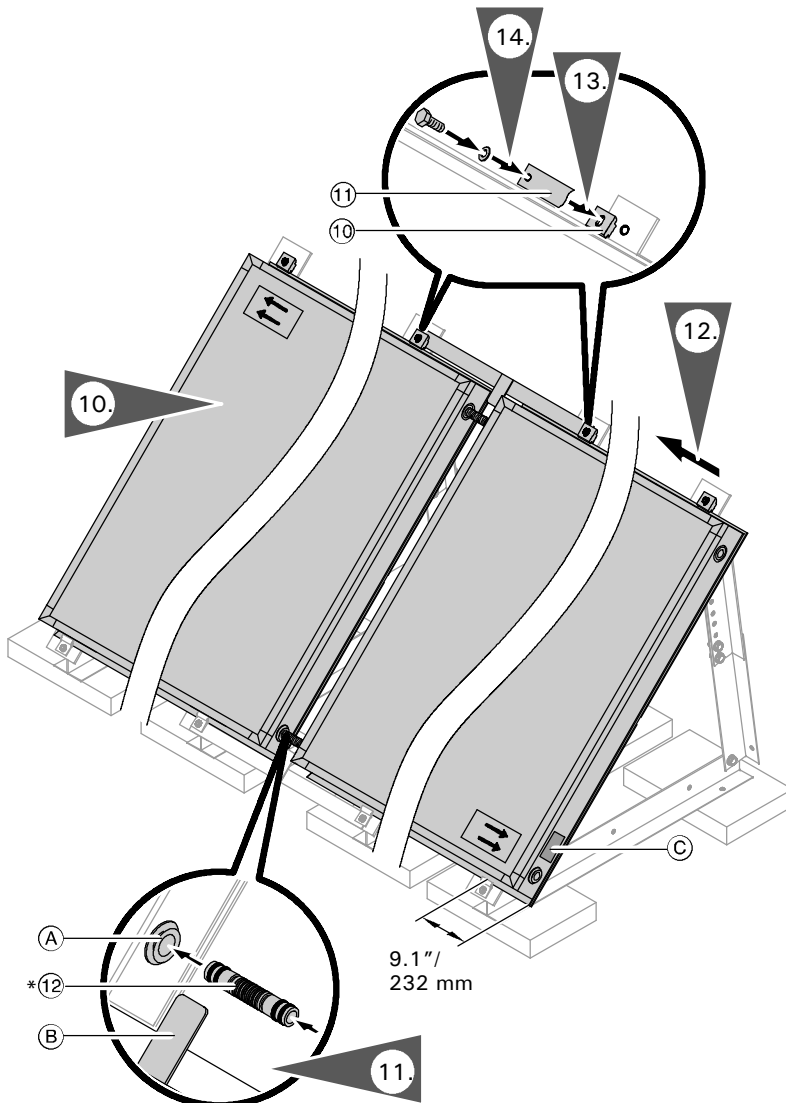
9. For added stability, attach connecting ties to each other where they intersect, using field supplied nut and bolt.

Ⓐ Ballast weight insert

Note:

See page 16 for numbered component description.

Installing Freestanding Installation (with ballast weight inserts - for Model SH only)



- Ⓐ Collector connection
- Ⓑ Spacer lip on connecting brace ⑪
- Ⓒ Rating plate

Note:

See page 16 for numbered component description.

* See page 8 for numbered component description.

10. Position the first collector into the retaining plates and push right up to the spacer lip of the connecting brace. Center the distance when fitting only a single collector.

IMPORTANT

Install the collector panel so that the rating plate side of the first and last collector is on the outside (note sticker)! If only one collector is to be installed, connect the piping opposite the nameplate side. See page 14 for more information.

11. Before inserting interconnection pipe ⑫*, mark the middle of the connecting pipe with a marker or a piece of tape for reference. Insert the interconnection pipe into the collector until the brass section is no longer visible.

IMPORTANT

Interconnection pipes must be free from damage and contamination. Lubricate all plug-in joints (O-ring seals) on the collectors. Use only the special grease supplied with the connection set.

12. Carefully push the next collector up to the spacer lip and insert the interconnecting pipes as far as possible.

IMPORTANT

Ensure interconnection pipe is centered between collectors.

13. Click clamping brackets ⑩ into the collector edge at the top of all supports.
14. Secure the connecting brace ⑪ turned by 180° to the next brace using the clamping brackets between the second and third, the fourth and fifth supports, etc.
15. The distance between collectors should be no greater than the width of the spacer lip Ⓑ on the connecting brace ⑪.
16. Tighten all screws.

Installation on Flat Roofs or Freestanding Installation

Installing Freestanding Installation (with ballast weight inserts - for Model SH only)

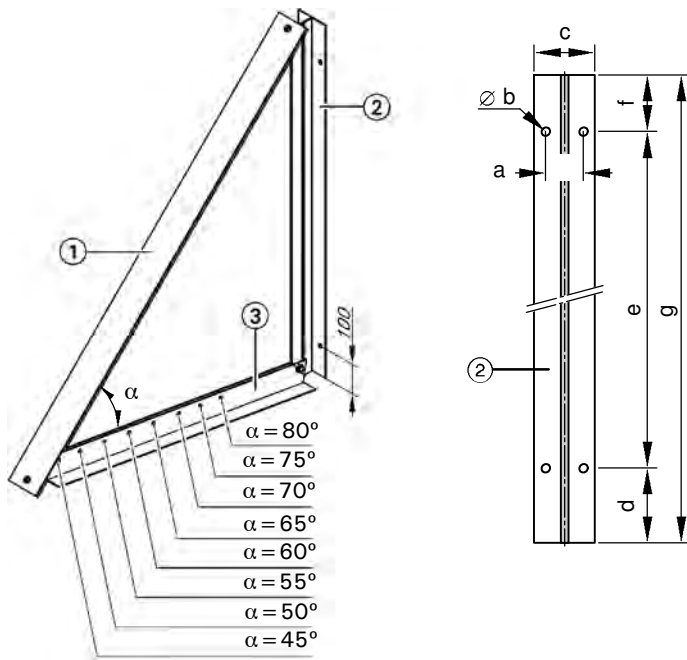
| Model SH | | Secure against slipping ^{*1} | | | Secure against lifting ^{*2} | | |
|--|-------------------|---------------------------------------|---------|----------|--------------------------------------|---------|----------|
| Installation height above ground level | ft. | < 26 | 26 - 66 | 66 - 328 | < 26 | 26 - 66 | 66 - 328 |
| | m | < 8 | 8 - 20 | 20 - 100 | < 8 | 8 - 20 | 20 - 100 |
| Required weight at 25° | lbs ^{*3} | 712 | 1237 | 1764 | 342 | 695 | 1049 |
| | kg | 323 | 561 | 800 | 155 | 315 | 476 |
| Required weight at 45° | lbs | 1085 | 1863 | 2641 | 291 | 560 | 827 |
| | kg | 492 | 845 | 1198 | 132 | 254 | 375 |

^{*1} Securing against slipping requires no additional attachment to roof.

^{*2} Securing against lifting requires additional attachment to roof or structure with wires or cables.

^{*3} Weights listed are the total of the insert weights and support slabs, per collector.

Overview of System Components (Vitosol-F, Model SH)



Legend:

- ① Collector support
- ② Cross brace
- ③ Adjustable support
- ④ Gusset plate with circular hole
- ⑤ Gusset plate with slot
- ⑥ Washer, Ø 8.4mm
- ⑦ Hexagon nut M8
- ⑧ Hexagon bolt M8 x 20
- ⑨ Retaining plate
- ⑩ Clamping bracket
- ⑪ Connecting brace

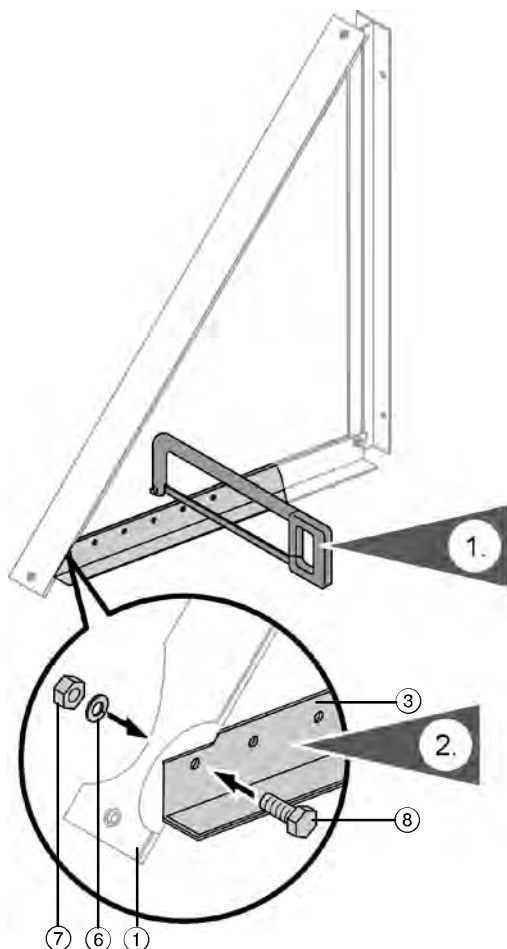
CAUTION

Wall mounting hardware is only supplied for SH series collectors.
Wall mounting is not recommended for SV series collectors.

Dimensions:

- a 2" / 50mm
- b Ø 0.4" / 11mm
- c 3.1" / 80mm
- d 4" / 100mm
- e 28.4" / 722mm
- f 3" / 75mm
- g 35.3" / 897mm

Installing the Collector Supports and Adjusting the Angle of Inclination α

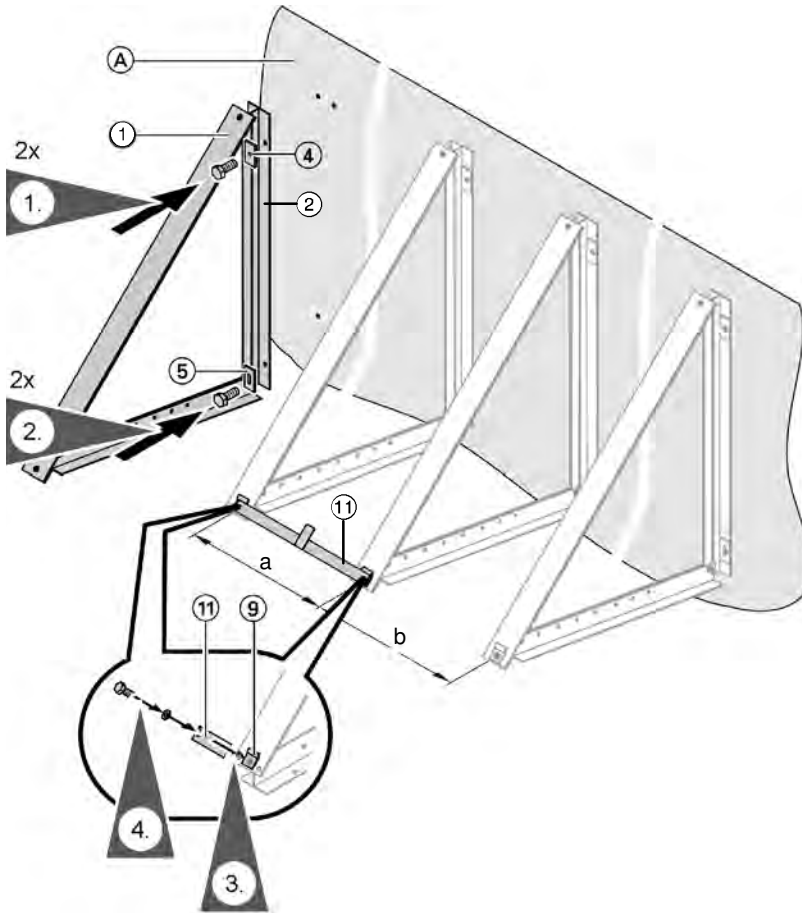


1. Trim adjustable supports (3) in accordance with the required angle of inclination (see page 25).
2. Secure the adjustable support (3) to the collector support (1) with bolts (8), nuts (7) and washers (6).

Note:

See page 25 for numbered component description.

Installing the Solar Collectors



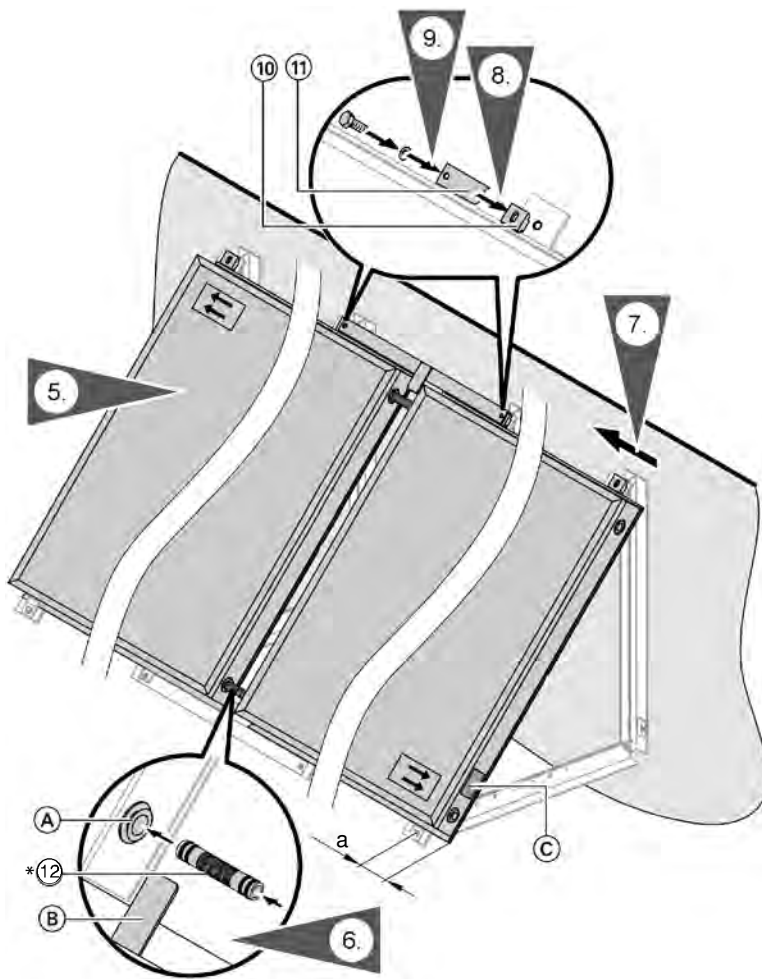
1. Use the cross braces ② as a drilling template.
Secure the cross braces with gusset plate **with circular hole** ④ at the top of the wall.
2. Secure the cross braces with **slotted** gusset plate ⑤ at the bottom of the wall.
3. Secure retaining plates ⑨ to the **bottom** of all collector supports ①; do not tighten the screws.
4. Secure the connecting brace ⑪ onto the retaining plates between the second and third, the fourth and fifth collector supports ① etc. Tighten all bolts.

Legend
 Ⓐ Wall

Dimensions
 a 19" / 481mm
 b 75.6" / 1920mm

Note:
 Please see page 25 for numbered component description.

Installing the Solar Collectors *(continued)*



Legend

- Ⓐ Collector connection
- Ⓑ Spacer lip on connecting brace ⑪
- Ⓒ Rating plate

a ≈ 9" / 230mm

Note:

See page 25 for numbered component description.

* See page 8 for numbered component description.

IMPORTANT

The top connecting brace ⑪ may be omitted on larger collector arrays to ensure that the collectors stay aligned vertically.

5. Position the first collector into the retaining plates and push right up to the spacerlip of the connecting brace. Center the distance when fitting only a single collector.

IMPORTANT

Install the collector panel so that the rating plate side of the first and last collector is on the outside (note sticker)! If only one collector is to be installed, connect the piping opposite the nameplate side. See page 14 for more information.

6. Before inserting interconnection pipe ⑫* mark the middle of the connecting pipe with a marker or a piece of tape for reference. Insert the connecting pipe into the collector until the brass section is no longer visible.

IMPORTANT

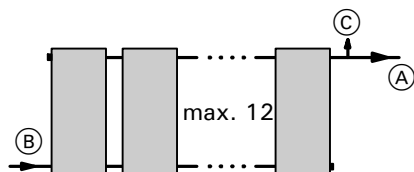
Interconnection pipes should not show any signs of damage. Lubricate all plug-in connectors (O-rings) found on the collectors only with the special grease supplied with the connection set.

7. Carefully push the next collector up to the spacer lip Ⓑ and insert the interconnecting pipes as far as possible until they are centred between the collectors.
8. Click clamping brackets ⑩ into the collector edge at the **top** of all supports.
9. Secure the connecting brace ⑪ turned by 180° to the next brace using clamping brackets ⑩ between the second and third, the fourth and fifth supports etc.
10. The distance between collectors should be no greater than the width of the spacer lip Ⓑ on the connecting brace ⑪.
11. Tighten all screws.
12. Fit a snow guard on the roof above the collectors, as required.

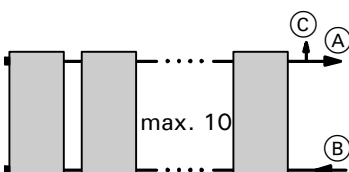
Supply and Return Piping Configuration

Vitosol 100-F / Vitosol 200-F Models SV, SH

Installation of collectors, connection on alternate sides, **max. 12** collectors.



Installation of collectors, single-sided connection, **max. 10** collectors.



- (A) Supply (hot)
- (B) Return
- (C) Air vent valve (shut-off type)

Collector Supply and Return Piping

- For the piping connecting the collectors to the Solar Divicon pumping station, Viessmann recommends the use of commercial copper pipe and bronze fittings, or non-galvanized steel pipe. **(PEX or other plastic pipes are not suitable for solar collector supply and return piping).**
- Use only high temperature solder or brazing material when connecting the copper pipes in the collector piping. The melting temperature should be above 450°F / 232°C.
- When laying out the collector array, ensure that the system can “breathe” properly. Do not route pipes above the collector array.

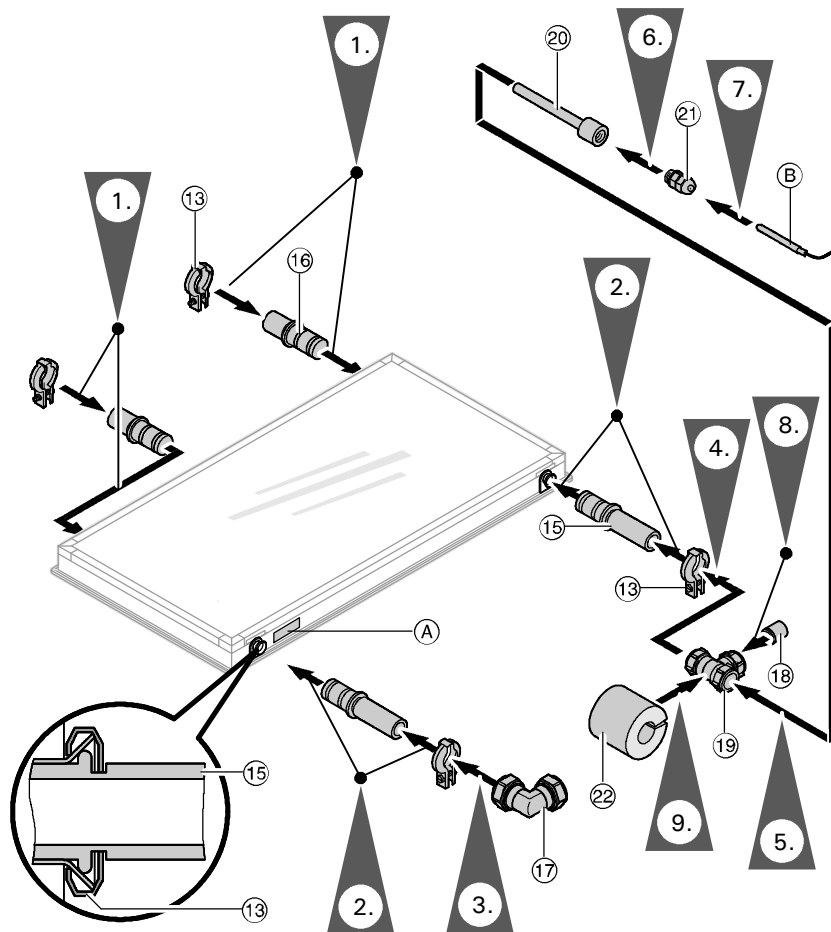
CAUTION

Do not use galvanized pipes, galvanized fittings or graphitized gaskets, or any type of plastic pipes.



Refer to the Vitosol System Design Guidelines for required flow rates and pipe sizing parameters for Vitosol-F collectors.

Installing the General Connection Set and Collector Temperature Sensor



(A) Rating plate

(B) Temperature Sensor from solar controller

Note:

Please see page 8 for numbered component description.



Refer to *Installation Instructions Supplement: Installation fitting (5355 935)* for information on air vent installation and metric pipe adaptors required for collector connections.

When assembling the locking ring compression fittings (17) and (19), observe the following:

- All pipe ends must be square and deburred.
 - Push the union nut and the locking ring onto the pipe adaptor and lightly lubricate the threads with oil.
 - Push the pipe into the compression fitting as far as it will go.
 - Initially, turn the union nut by hand, then tighten with an open ended spanner by another $\frac{3}{4}$ turn.
- Do not use annealed copper pipes with compression fittings.

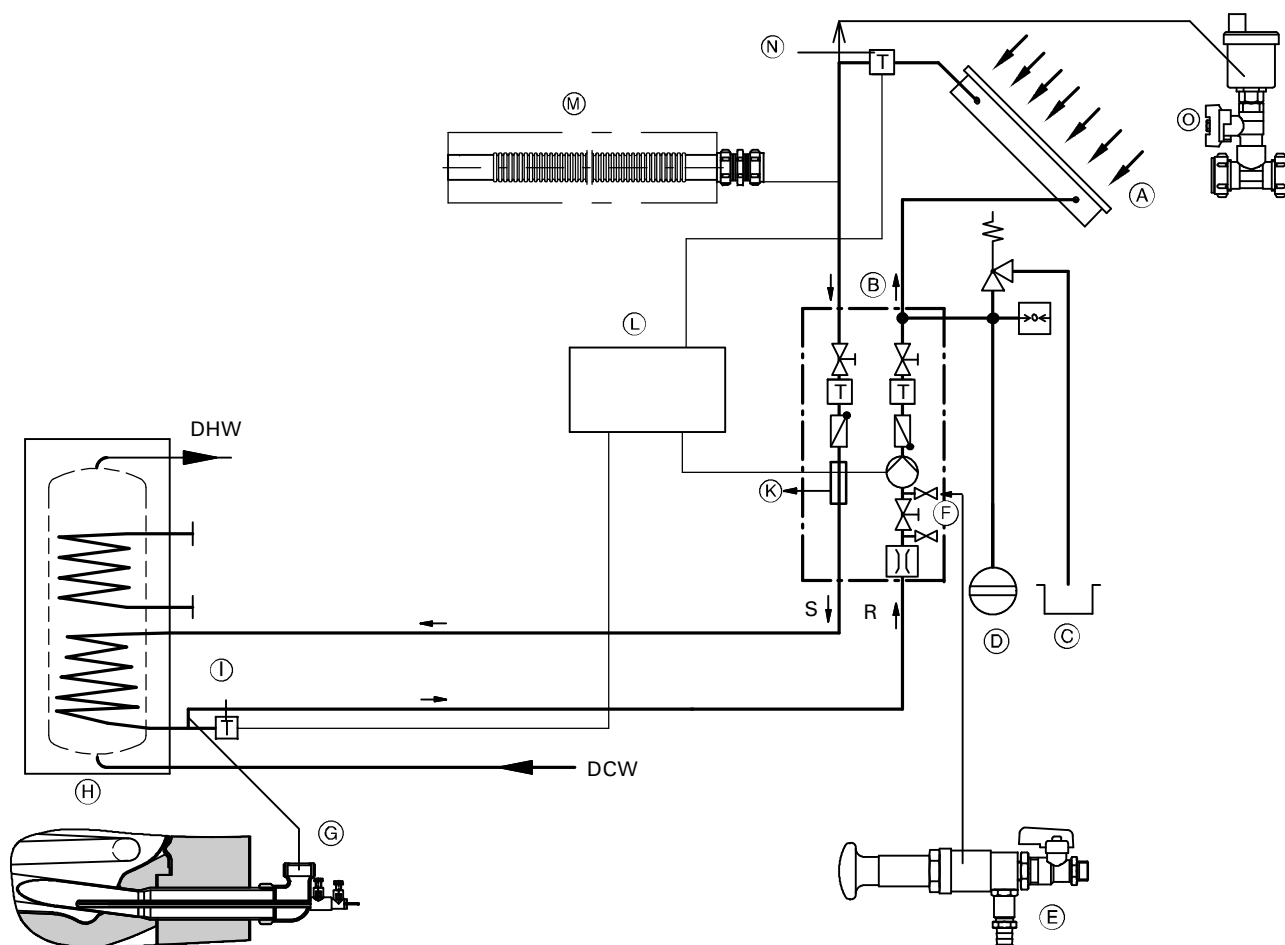
1. Insert the plugs (16) until they bottom out, and secure with pipe clips (13).
2. Insert the connection pipes (15) until they bottom out and secure them with pipe clips (13).
3. Fit the elbow (17) onto the return connector at the bottom of the collector.
4. Fit the tee (19) onto the supply connector at the top of the collector.
5. Insert the sensor well (20) into the tee (19). Hold the tee tightly.
6. Insert the strain relief fitting (21) into the sensor well.
7. Insert the collector temperature sensor (B) (supplied with solar controller) until it bottoms out inside the sensor well, and secure with strain relief fitting.
8. Insert the 4" copper adaptor (18) into the compression fittings and make the connection between the panel array and the supply and return piping.
9. Install the insulation (22) and secure with adhesive on its cut faces.



CAUTION

The collectors may be damaged if the solar heating system is not filled with heat transfer medium immediately after installation. Therefore protect the collectors against insolation by covering them up.

Sample System Layout



- (A) Solar collector
- (B) Solar-Divicon (pumping station)
- (C) Overflow container
- (D) Expansion vessel
- (E) Solar manual filling pump (optional)
- (F) System fill manifold valve
- (G) Screw-in elbow, comes with sensor well
- (H) Solar storage tank
- (I) Tank temperature sensor
- (K) Air separator
- (L) Solar control unit
- (M) Flexible connection pipe (optional)
- (N) Collector temperature sensor
- (O) Fast air vent, c/w shutoff valve *1

R Return to collector
S Supply from collector

*1 Install at least one air vent valve at the highest point of the system.



Refer to the Vitosol System Design Guidelines for more information on other installation examples and system types.



WARNING

The domestic hot water temperature must be limited to 140°F / 60°C by installing a mixing device, e.g. a thermostatic anti-scald mixing valve.

System Installation



Please refer to the Vitosol "System Design Guidelines" for supplementary notes on installation examples and system types.

- The connecting lines must be pressure and temperature-resistant (observe the max. shutdown temperature of the collector).
- To guarantee the satisfactory operation of the solar heating system, install the pipes so that complete air venting is assured.



CAUTION

Use only red bronze fittings, brass fittings and copper piping. Do not use galvanized pipes, galvanized fittings, graphitized gaskets or any type of plastic pipe.



CAUTION

Do not carry out any soldering work at or near the collector.

- At least one fast-acting air vent with shut-off valve must be installed at the highest point of the system. Install an air separator in the flow of the solar circuit, upstream of the inlet to the indirect coil of the domestic hot water tank. Air separation is standard in Solar-Divicon.

- The system must be equipped with an expansion tank, safety valve and circulation pump.

- The Solar-Divicon is equipped with a safety valve designed for max. 87 psig / 6 bar.

- Use only a diaphragm expansion tank that is suitable for the application as a solar expansion tank.

- The expansion tank must be approved for use in a solar heating system and must be connected via a heat insulating loop.

The diaphragms and seals of the expansion tank and the safety valve must be suitable for the heat transfer medium.



Please refer to the "Service Instructions" in order to calculate the inlet pressure of the diaphragm expansion vessel.

- Before filling system with solar heat transfer fluid, thoroughly flush and clean piping system to remove all dirt, oils, flux and solder residue.

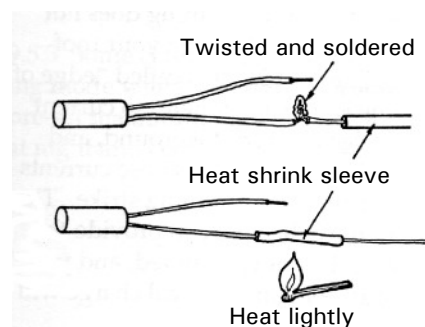
- Fill the solar heating system with Viessmann heat transfer medium "Tyfocor-HTL" or suitable fluid as described on page 7. The "Tyfocor-HTL" is supplied as a premixed glycol/water solution and must not be mixed. The blow-off and discharge pipes must be run to an open container capable of accommodating the total capacity of the collectors.



CAUTION

Components used must be resistant to the heat transfer medium. Insulation of external piping must be resistant to temperature^{*1}, UV radiation and to destruction by birds (e.g. through the use of metal sheathing).

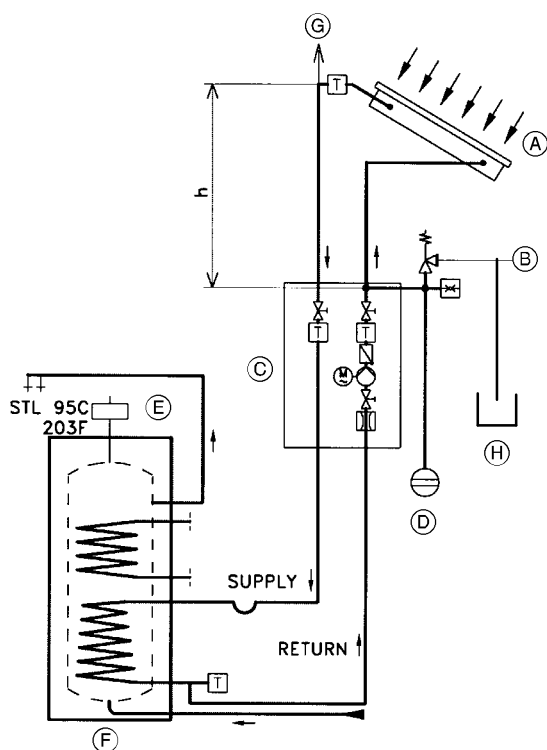
- Prior to installing pipe insulation, run a stranded and protected 18/2 AWG low voltage sensor wire from the solar controller to the collector sensor well. Ensure all wire connections are soldered and sealed with heat shrink sleeve connectors (see illustration below). Cover all wire and connections with insulation and jacket.




Source: CANSIA

^{*1}E.g. HT/Armaflex (temperature resistant up to 175 °C) supplied by Armstrong Insulation Products

Initial Start-up



- (A) Collector
- (B) Pressure relief valve
- (C) Solar-Divicon
- (D) Diaphragm expansion vessel
- (E) High-limit safety cut-out
- (F) Solar storage tank
- (G) Air vent c/w shut-off
- (H) Overflow container
- [T] Temperature sensors

 Refer to Vitosol Start-Up, Service and Operating Instructions for detailed information on flushing, filling, venting and setting system pressures.

The collector circuit must be protected in such a way that at the highest possible collector temperature (shutdown temperature) no heat transfer fluid can escape from the safety valve, or the air vent. This is achieved by the appropriate sizing of the expansion tank and matching of the system pressure.

IMPORTANT

Under cold fill conditions, a minimum static pressure must be maintained. It can be calculated by the following:
 $15 \text{ psig} + 0.45 \text{ psig} \times \text{h(ft.)}$
 or
 $1.0 \text{ bar} + 0.1 \times \text{h(m)}$

CAUTION

The pressure relief valve must be piped to the overflow container or drain at all times, since excessively hot fluid can discharge from the system.

CAUTION

After de-aeration, the air vent c/w shut-off at top of system must be closed. To protect the solar system from overheating in the summer, e.g. during the holidays, do not shut off the power to the solar system.

Commissioning and Adjustment



For commissioning of the solar heating system, refer to the Vitosol Start-Up, Service and Operating Instructions and Solar Divicon Installation, Start-Up and Service Instructions.

Post-Installation Information...

Checklist

- ☐ Has the solar circuit been installed in accordance with the circuit diagram and all relevant standards?
- ☐ Have the collectors been installed with a slight upward gradient towards the piping side?
- ☐ Have the supply and return connections been carried out and pressure tested?
- ☐ Have the electrical connections been carried out correctly?
- ☐ Have the sensors been installed correctly?
- ☐ Have air vent valves been installed at the highest points of the system and are they open?



CAUTION

It is absolutely essential to close the air vent valves again when the system has been started up and de-aerated.

- ☐ Have all screws, screwed pipe connections and covers been securely tightened?
- ☐ Has the solar hot water tank been filled with water?
- ☐ Does the maximum capacity of the expansion vessel correspond to the value stated in the System Design Guidelines?
- ☐ Has the inlet pressure of the expansion vessel been adjusted to the system cold fill pressure?
- ☐ Have connecting pipes been insulated and protected from the elements?



Viessmann Manufacturing Company (U.S.) Inc.
45 Access Road
Warwick, Rhode Island • 02886 • USA
Tel. (401) 732-0667 • Fax (401) 732-0590
www.viessmann-us.com • info@viessmann-us.com

Viessmann Manufacturing Company Inc.
750 McMurray Road
Waterloo, Ontario • N2V 2G5 • Canada
Tel. (519) 885-6300 • Fax (519) 885-0887
www.viessmann.ca • info@viessmann.ca

5285 710 v2.3

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