

Installation, Start-up and Service Instructions

VIESSMANN®

Solar-Divicon-HX
Solar heat transfer station
c/w double wall heat exchanger



SOLAR-DIVICON-HX



IMPORTANT

Read and save these instructions
for future reference.

About these Instructions

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).

■ Product documentation

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

► These instructions describe the function, installation, startup and operation of the Solar-Divicon-HX heat transfer stations. For other components of the solar system such as collectors, storage tanks, expansion tanks and controllers, please observe the instructions supplied with those components.



► This symbol indicates that other instructions must be referenced.

■ Applicability

Vitosol solar collectors and pumping stations 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. Other heat transfer fluids may be suitable if they have the same temperature range -35°F to 170°F (-31°C to 77°C) and are non-toxic.

■ Licensed professional heating contractor

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

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



■ Important Symbols

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



WARNING

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



CAUTION

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

■ 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 before the heating season begins.

Solar-Divicon-HX may only be used as a heat transfer station between the solar collector loop and storage tank loop in closed loop solar thermal systems taking into consideration the technical limit values indicated in these instructions. Improper usage excludes any liability claims.

■ Warranty

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



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Important Regulatory and Safety Requirements

The installation and startup of the solar station as well as the connection of electrical components require technical knowledge commensurate with recognized vocational qualification as a fitter for plumbing, heating and air conditioning technology, or a profession requiring a comparable level of knowledge [specialist].

The following must be observed during installation and startup:

- » Relevant local and national regulations
- » Accident prevention regulations of the professional association
- » Instructions and safety instructions mentioned in this manual

Instructing the system user

The installer of the system is responsible to ensure the system operator/ultimate owner is made familiar with the functioning of the system, its activation, and its shut-down.

- *The following topics must be covered:
Proper system operation sequence.
Explain the equipment.
Demonstrate an emergency shut-down, what to do and what not.
Explain that there is no substitute for proper maintenance to help ensure safe operation.*

Initial start-up

Initial start-up must be performed by a qualified heating contractor. Completion of the Maintenance Record by the heating contractor is also required.

- *The Maintenance Record is located in the Vitosol Start-up, Service and Operating Instructions.*

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 hot water heating systems. There are no user serviceable parts on this equipment.

- *Please carefully read this manual prior to attempting start-up, maintenance or service. Any warranty is null and void if these instructions are not followed.*

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

Viessmann offers frequent installation and service seminars to familiarize our partners with our products. Please inquire.

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

- *The completeness and functionality of field supplied electrical controls and components must be verified by the heating contractor. These include low water cut-offs, flow switches (if used), staging controls, pumps, motorized valves, air vents, thermostats, etc.*

■ Grounding/lightning protection of the solar system

In the lower part of the building, install an electrical conductor on the solar circuit's piping system 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.

Technical literature

Literature applicable to all aspects of the Vitosol 100-F, 200-F or Vitosol 200-T:

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

- *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.*

Important Regulatory and Safety Requirements *(continued)***WARNING**

Check system pressure frequently. Excessive system pressure may result in damage to the equipment, personal injuries or loss of life.

IMPORTANT

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

**WARNING**

With pressure relief valves there is danger of scalding due to vapor escape. A discharge line must be connected to the pressure relief valve leading off-blowing solar fluid and vapor to an adequate heat-resistant container. Observe the instructions regarding the pressure relief valve.

IMPORTANT

Replacement and wear parts which have not been tested together with the solar system can compromise its function. Installing non-authorized components and non-approved modifications/conversion can compromise safety and may infringe our warranty conditions. For replacement, use only original Viessmann replacement parts or those which are approved by Viessmann.

**CAUTION**

Install the station at a sufficient distance to the collector field, since the solar fluid may be very hot near the collector.
It may be necessary to install an intermediate tank in order to protect the expansion tank.

IMPORTANT

Repairing components which fulfil a safety function can compromise the safe operation of your heating system. Replace faulty components only with original Viessmann replacement parts.

**CAUTION**

It is imperative to prevent that the EPDM seals of the station get in contact with substances containing mineral oils. Mineral oil products cause lasting damage to the material, whereby its sealant properties are lost. If necessary, ask the manufacturer whether the solar fluid, fats or installation aids contain mineral oils. We do not assume liability nor provide warranty for damage to property resulting from sealants damaged in this way.

Description

Solar-Divicon-HX is a premounted group of fittings and components used to transfer the heat from the primary or solar loop to the secondary or storage tank loop. The primary and secondary loop are separated with a generously sized stainless-steel double wall heat exchanger with visible leak detection. The heat exchanger is UL certified for use with potable water. The fittings in the secondary side are approved for potable water applications and are made of lead free brass so the station can be directly connected to potable water tanks.

The station contains a preset controller and the valves, fittings, pumps and safety equipment necessary to operate a Vitosol solar thermal system.

The expansion tank required for operation is not part of the transfer station and must be ordered separately. The expansion tank must be sized for the number of collectors in the system. Refer to the Vitosol System Design Guide for sizing details.

An ASME stamped pressure relief valve must be field supplied and mounted on site to protect the transfer station from overpressure in the secondary loop.

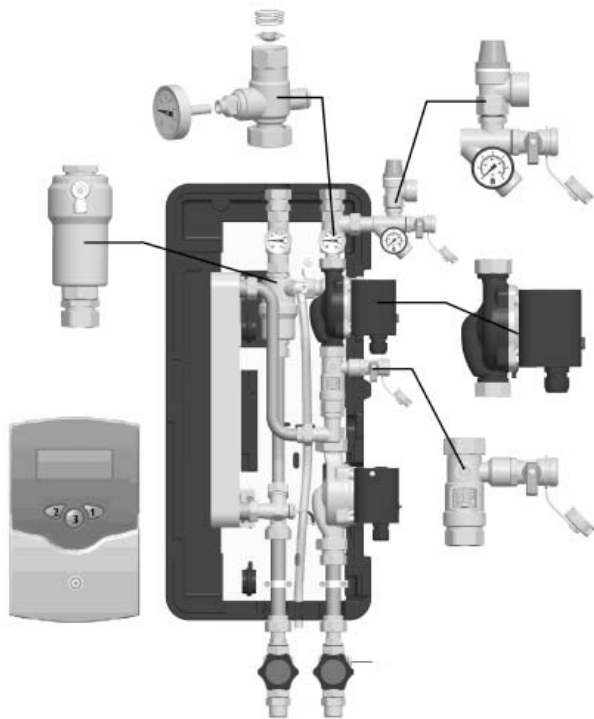


Fig. 1 Solar-Divicon-HX components

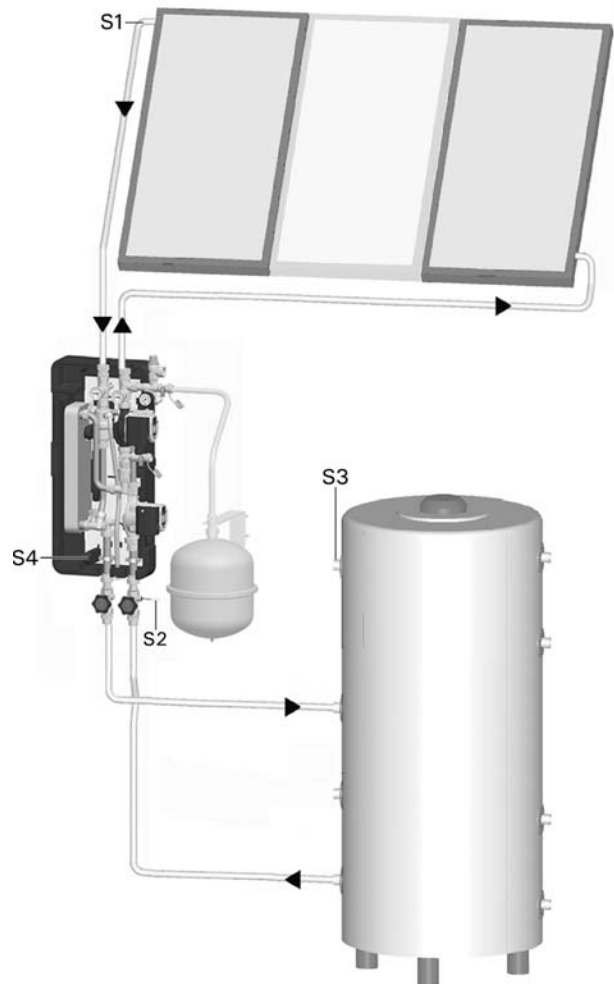


Fig. 2 Typical piping connection

Note:

Field piping not exactly as shown. Refer to layout drawing on page 10 for piping and wiring details.

Primary and Secondary Loop

The primary (solar) loop comprises:

- a- ball valve with integrated temperature gauge and check valve, solar supply
- b- ball valve with integrated temperature gauge and check valve, solar return
- c- pressure relief valve - 87 psig
- d- drain valve for flushing / filling
- e- pressure gauge and connection for expansion tank
- f- solar 3-speed circulation pump
- g- flowmeter to display and balance the flow rate
- h- fill valve for flushing / filling
- i- double-wall heat exchanger
- j- air-scoop with discharge line

The solar ball valves (a and b) are equipped with spring-charged check valves to prevent gravity circulation.

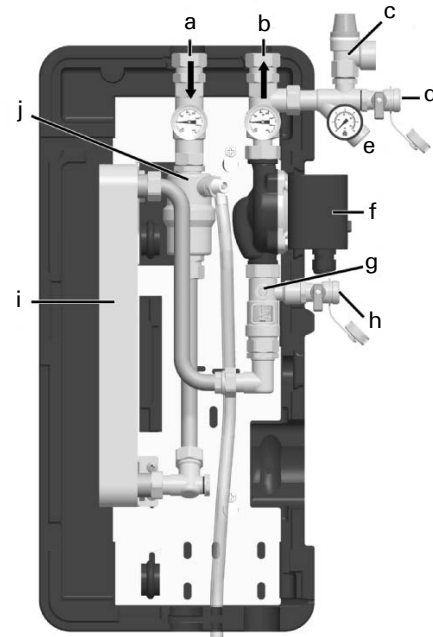


Fig. 3 Primary solar loop components

The secondary (DHW storage tank) loop comprises:

- A- $\frac{3}{4}$ " male nipple for connection of an ASME stamped pressure relief valve (PRV ordered separately, maximum 150 psig)
- B- DHW 3-speed bronze circulation pump
- C- isolation valve in the storage tank return
- D- isolation valve in the storage tank supply
- E- temperature sensor S2, DHW return
- F- temperature sensor S4, DHW supply

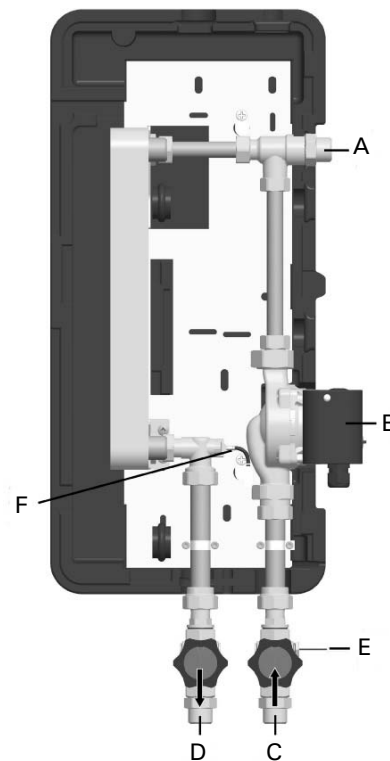


Fig. 4 Secondary tank loop components

Mounting the Solar-Divicon-HX

The location of installation must be dry, load-carrying and frost-proof. Future access to the controller and the safety equipment must be always guaranteed!



CAUTION

The mounting location must be able to carry the full weight of the Solar-Divicon-HX. Take into account the full weight of the unit. Damage or injury could occur if not mounted securely.

The discharge line of the pressure relief valve must lead into a heat-resistant collecting tank with corresponding size. The jug for the "Tyfocor-HTL" solar fluid can be used for this purpose. This allows you to easily refill the circuits and to avoid undesired discharge into the environment!

1. Copy the holes to be drilled to the mounting surface. The cardboard under the station may serve as a template.
2. Drill the holes and insert the enclosed wall anchors.
3. Turn in the screws so that about 1" of each screw still sticks out.
4. Pull off the insulating front shell. Hang the station onto the screws and tighten the screws.
5. Connect the transfer station to the system by pipework:
 - » 1 supply from solar panel
 - » 2 return to solar panel
 - » 3 storage tank supply
 - » 4 storage tank return

All pipe connections are $\frac{3}{4}$ ". The actual size of the supply and return piping will vary depending on the type and number of collectors used and the total length of the pipe run. Please call Viessmann for sizing assistance.

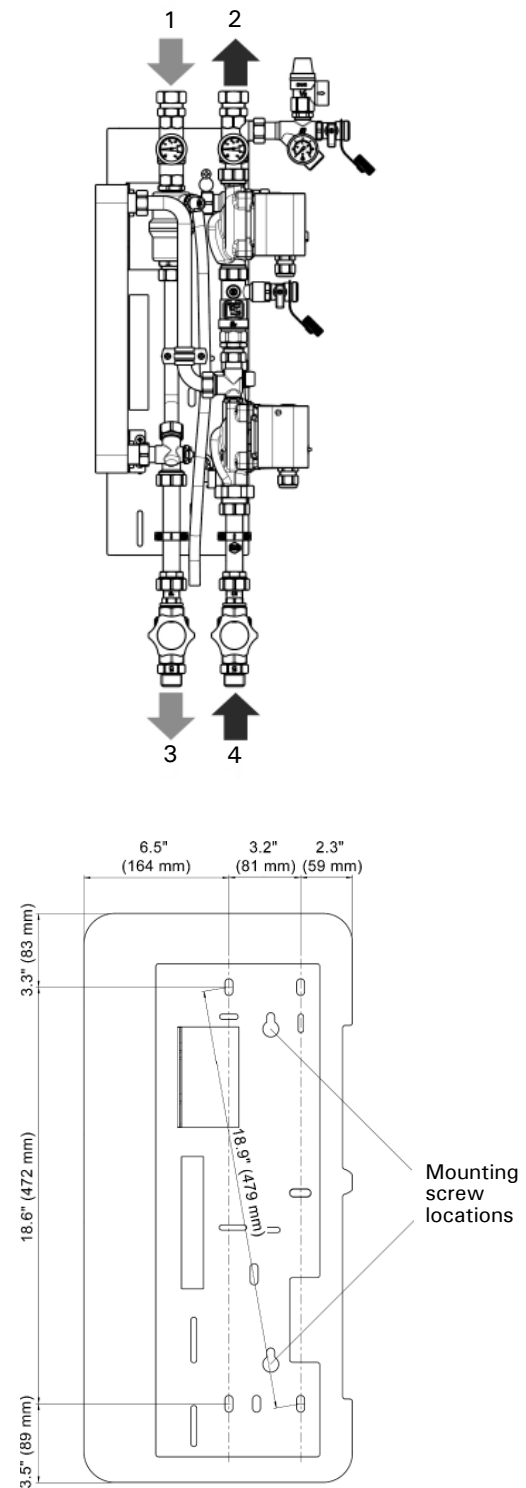


Fig. 5 Pipe connections and mounting plate

Connection Fittings for Primary (Solar) Loop

The connection to the solar thermal system is carried out fast, pressure-proof and without soldering with the supplied compression fittings.

1. Push the union nut ② and the cutting ring ③ onto the copper pipe ①. The pipe must protrude at least $\frac{1}{8}$ " from the cutting ring in order to ensure the force transmission and the sealing.
2. Insert the support sleeve ④ (supplied with the Solar-Divicon-HX) into the copper pipe.
3. Insert the copper pipe with the plugged-on individual parts ②, ③ and ④ all the way into the housing of the compression fitting (5) mounted on the ball valves of the Solar-Divicon-HX.
4. Tighten the union nut ② manually to start.
5. Tighten the union nut ② by rotating with wrench one full turn. Secure the housing of the compression fitting ⑤ with a second wrench against distortion in order to avoid damaging the sealing ring.

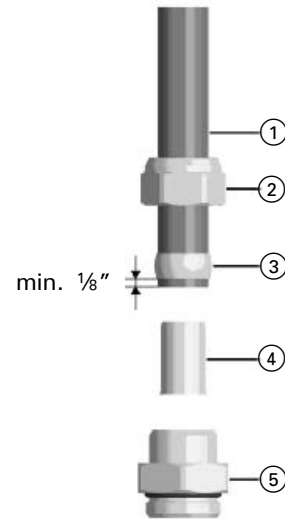


Fig. 6 Primary loop piping connection

Pipe and Fitting Connections

1. Mount the solar safety equipment to the connection above the return ball valve using the gasket supplied in the accessory kit.
2. Connect the expansion tank below the pressure gauge using $\frac{3}{4}$ " piping.
3. Mount the expansion tank.
Note: The expansion tank must not be connected, or must be isolated during flushing and filling in order to avoid that dirt particles are washed in.
4. Connect a discharge line to the pressure relief valve in the solar circuit. The jug for the "Tyfocor-HTL" solar fluid can be used for this purpose.
5. Connect an ASME stamped pressure relief valve (not part of delivery) to the NPT male nipple (A) in the storage tank loop. Maximum pressure is 150 psig.
6. Connect a discharge line to the pressure relief valve in the storage tank circuit and pipe to a floor drain.
7. Before connecting the expansion tank, pressurize the air cushion of the expansion tank according to the instructions in the Vitosol manual.



For additional information, follow the procedures in the Vitosol Start-up, Service and Operating Instructions.

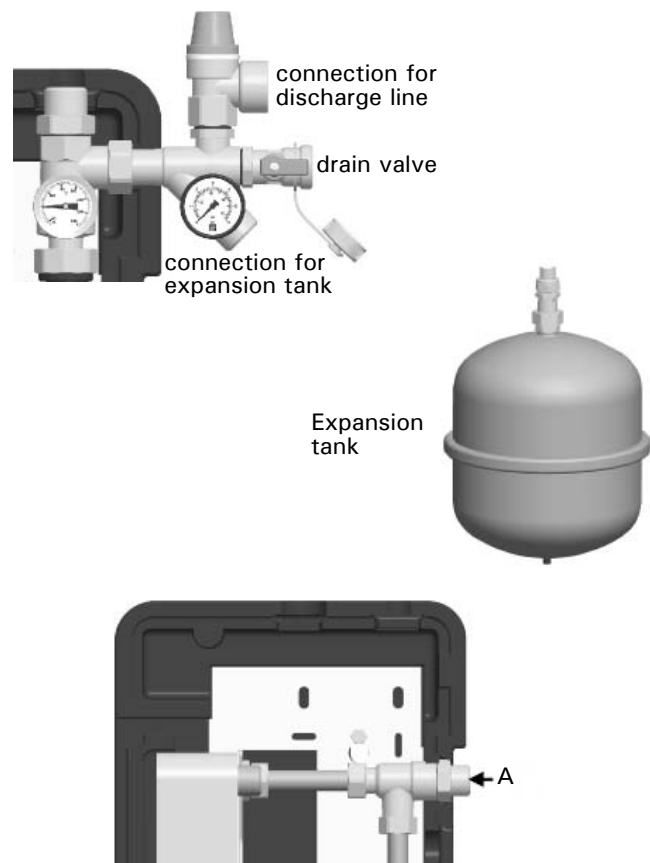


Fig. 7 Connection details

Connections

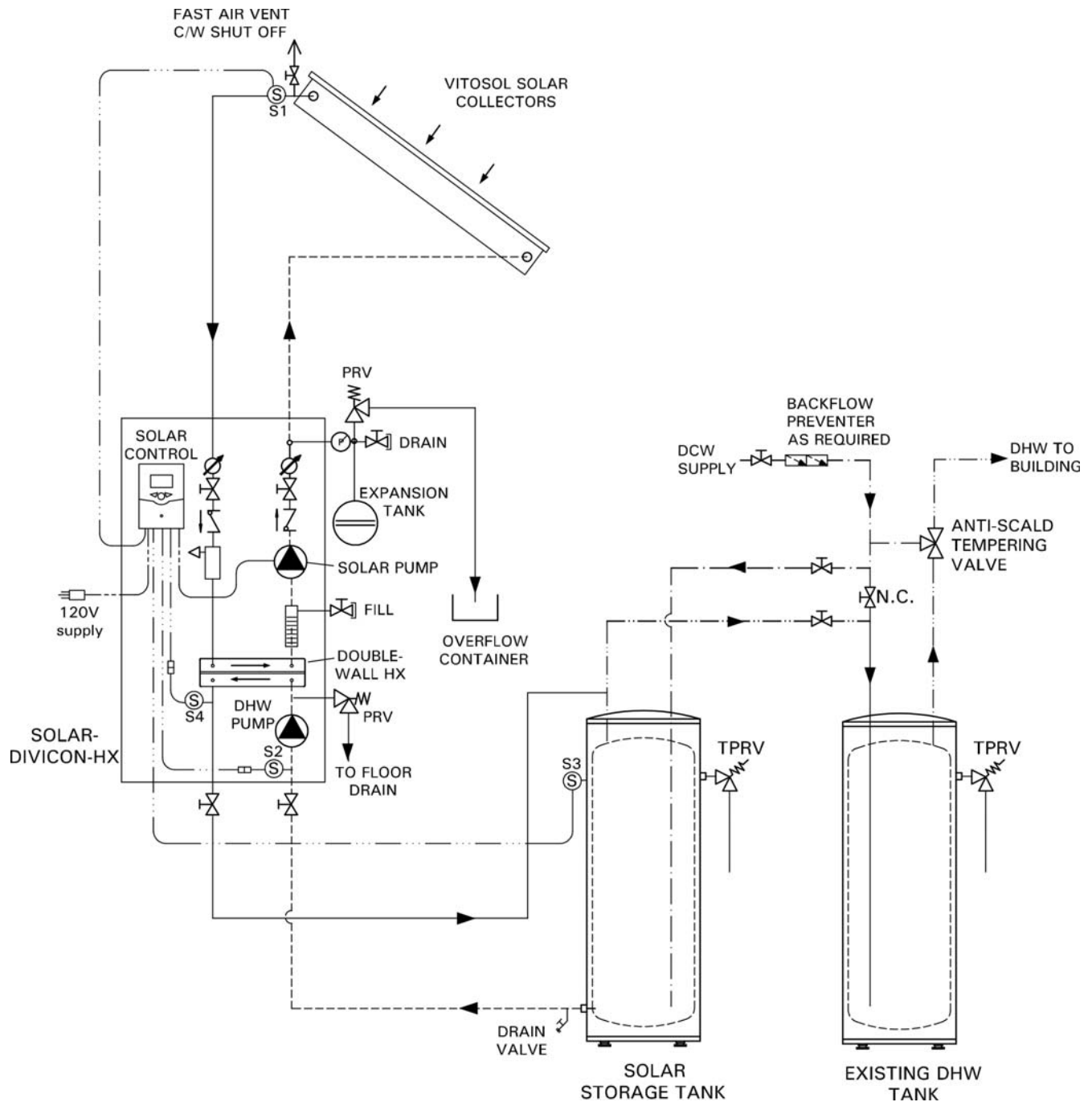


Fig. 8 Typical system layout

Controller Connection

1. Connect the temperature sensors:
 - Collector sensor (TCOL) to S1. Install the sensor in the sensor well kit provided with Vitosol collectors. Connect to the control using 18/2 thermostat wire.
 - Tank return (TSEC) to S2. The sensor is preinstalled in the isolation valve in the storage tank return line (see diagram on page 7). Use the quick-connect plug to join together the sensor wire and pre-wired sensor cable from the control.
 - Storage tank sensor (TST) to S3. Install sensor at the same level as the tank supply inlet. Install in an immersion sensor well, if possible.
 - Solar return line sensor (TPRI) to S4. This sensor is pre-installed in the elbow fitting in the DHW return line (see diagram on page 7). Use the quick-connect plug to join together the sensor wire and pre-wired sensor cable from the control.

2. Tighten all union nuts and screw connections.

The assembly of the heat transfer station is now completed and you can put the station into operation.



Refer to the separate instructions regarding the controller.



WARNING

Prior to commencing electrical work on the controller, disconnect the mains plug to avoid possible electric shock! Only after completing all installation work, plug the mains plug of the controller into an outlet. This avoids an unintentional start of the motors.

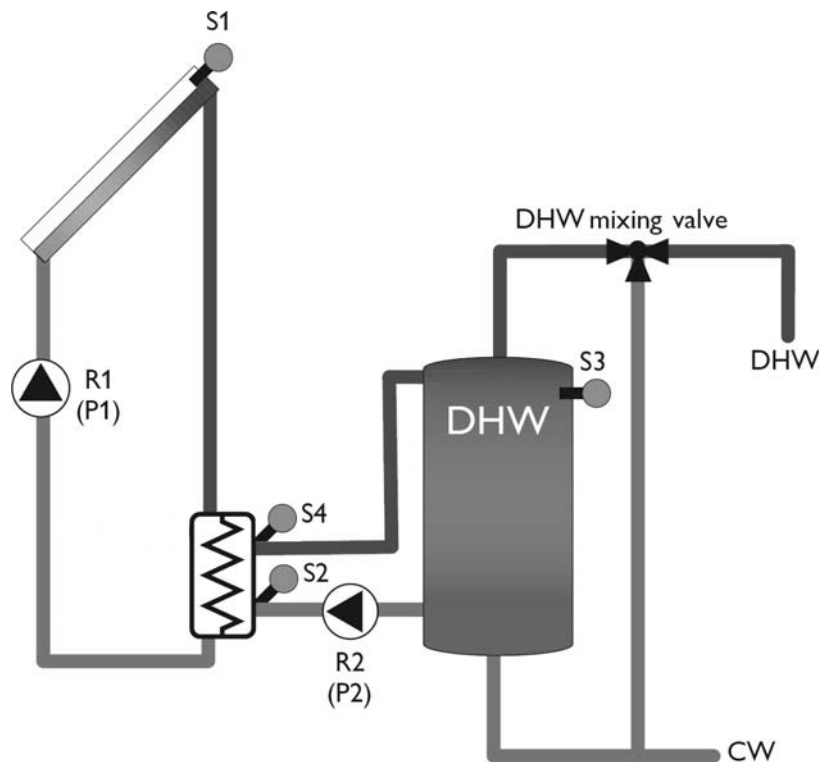


Fig. 9 Possible connection diagram

Safety

Observe the following safety instructions regarding the startup of the station:



WARNING

The valves and fittings can heat to temperatures of more than 212° F (100° C) due to the solar fluid. Therefore, do not flush or fill the system with the collectors heated (intense sunshine).

Please note that hot solar fluid can leak from the pressure relief valves in case of excessive system pressure!

During venting hot solar fluid or vapor may escape and cause scalding!

Commisioning Sequence



CAUTION

It is often the case that the solar system cannot be completely drained after flushing. Thus, there is risk of frost damage when flushing with water. It is recommended to only use the solar fluid to flush and fill the solar system.

Use "Tyfocor HTL" solar fluid.

For commissioning flush and fill in the following sequence:

1. Flush the solar storage tank (to remove scale residues)
2. Fill the solar storage tank circuit
3. Flush and fill the solar heat exchanger
4. Flush and fill the collector field and primary solar loop
5. Flush and fill the complete solar circuit

This guarantees that dirt particles are not flushed into the heat exchanger and that eventually absorbed heat can also be dissipated.

IMPORTANT

Failure to follow flushing and filling sequence can lead to heat exchanger blockage.

Flushing and Filling the Storage Tank Loop

The storage tank loop is filled with potable water by means of the valves and fittings of the tank. To avoid that dirt particles are washed into the heat exchanger, close the ball valves of the station and wash the dirt particles and scale residues out of the tank.

- 1. Open the piston valves (B) (C).
- 2. Fill the storage tank loop using the valves and fittings of the tank.
- 3. Vent the storage tank loop by opening and closing the pressure relief valve (A) installed in the secondary circuit.

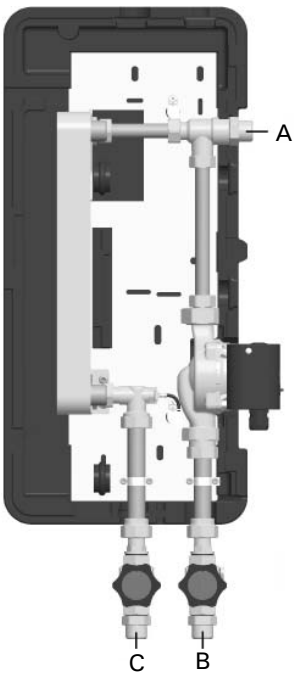


Fig. 10 Secondary tank loop components

Flushing and Filling the Solar Loop

The valves and fittings required to flush and fill are integrated in the heat transfer station. Make sure not to wash dirt particles from the solar loop into the heat exchanger and the expansion tank. Therefore only use flush and fill stations with fine filters. The solar loop is flushed opposite to the normal direction of flow. Make sure that an unintentional start of the solar pump is not possible by de-energizing the pump.

Check valve bypassing


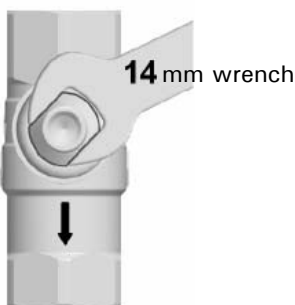

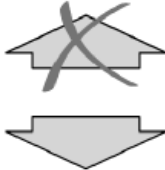
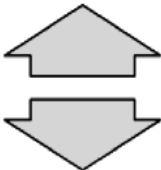
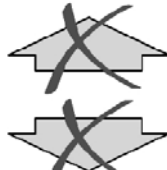
0°	45°	90°
		
		
Check valve is operating, flow only in flow direction.	Check valve is not operating, flow in both directions.	Ball valve closed, no flow.

Fig. 11 Check valve and shut off valve operation

Flushing the Heat Exchanger

1. Disconnect the expansion tank from the solar system and temporarily plug expansion tank pipe connection. This avoids that the dirt particles in the pipes are washed into the expansion tank.
2. Put the check valve temporarily out of operation by turning the solar supply ball valve (a) to position 45° (see page 13).
3. Close the solar return ball valve (b) (position 90°).
4. Connect the flush and fill station
 - pressure hose to the fill valve (d)
 - flush hose to the drain valve (c)
5. Open the fill and drain valves (d) (c) and put the flush and fill charge station into operation.
6. Slowly open the return ball valve (b) during flushing in order to vent the pump section.
7. Flush the solar installation until the solar fluid exits without bubbles or debris.
8. Close the drain valve (c) with the filling pump running and increase the system pressure to about 72 psi (5 bars). The system pressure can be read on the pressure gauge.
9. Close the fill valve (d) and switch off the pump of the flush and fill station.
10. Check the pressure gauge to see whether the system pressure reduces and eliminate leaks where necessary.
11. Reduce the pressure on the drain valve (c) to the final fill pressure.
12. Connect the expansion tank to connection (e) and set the final fill pressure of the solar system using the flush and fill station.



Refer to the Vitosol Start-up, Service and Operating Instructions for recommended expansion tank cold fill and system final fill pressures.

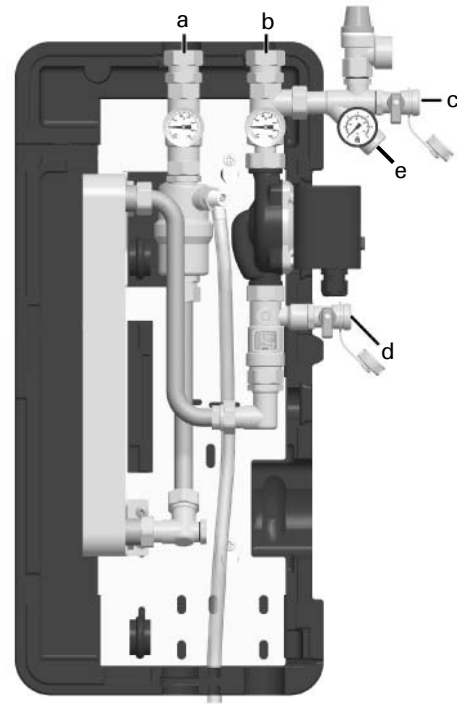



Fig. 12 Primary solar loop components

Flushing the Heat Exchanger *(continued)*

- 13. Close the fill and drain valves (d) (c).
- 14. Put the check valves into operating position by turning the ball valves (a) (b) to position 0° (see page 10).
- 15. Connect the controller to the power supply. Set the solar circuit pump in the manual mode to ON.
- 16. Let the solar circuit pump run at maximum rotation speed for at least 15 minutes.

 *Refer to the separate instruction regarding the controller*

- 17. If necessary, increase the system pressure to the final fill pressure again.
- 18. Remove the hoses of the flush and fill station and screw the sealing caps onto the fill and drain valves. The sealing caps only serve to protect the valves against dirt. They are not designed to take up high system pressures, the valves must be closed.

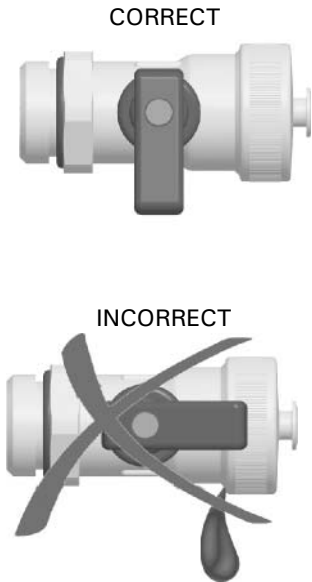



Fig. 13 Fill and drain valve positions after start-up

Air-Scoop

The air-scoop with manual vent valve (shown as (j) on page 7) is used to vent the solar system. To ensure perfect deaeration of the solar loop, the flow velocity must be at least 0.3 m/s in the flow line.

Pipe diameter	Min. flow rate at 0.3 m/s (US gpm)
1/2"	0.63
3/4"	1.49

**WARNING**

Open the vent plug carefully. The escaping medium can have a temperature of more than 212°F (100°C) and cause scalding.

IMPORTANT

After commissioning, vent the solar system daily and then weekly or monthly, depending on the vented air quantity. Thus, an optimum operation of the solar installation is ensured. Check the system pressure after venting and increase it to the specified operating pressure, if necessary.



Fig. 14 Cutaway of air-scoop

Setting the Flow Rates

1. Switch on the pumps at the controller in manual mode.
[Main menu \ Manual operation \ All relays: ON]
2. Set the desired speed level (I to III) of the solar pump to obtain the required flow rate. The current flow rate can be read at the Flowmeter.
3. Set the speed level of the storage tank circuit pump to obtain at most the same flow rate as in the solar loop.
4. Switch the relays at the controller to automatic mode.
[Main menu \ Manual operation \ All relays: AUTO]
5. Mount the insulating front shell.



Refer to the Vitosol Start-up, Service and Operating Instructions for the correct adjustment of the flow rate.

IMPORTANT

The system must be clean and free of air and contaminants to ensure a correct measurement.

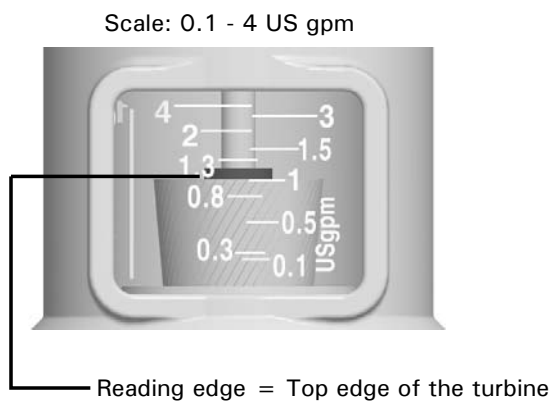


Fig. 15 DN 20 Flowmeter

Draining the Solar Circuit



WARNING

The escaping medium may be very hot. Place the collecting container so that anyone standing nearby are not in danger of scalding when the solar system is being emptied.

1. Disconnect power supply to the controller and make sure that an accidental restart is not possible.
2. Open the check valves in the supply and return ball valves (a) (b) by turning them to position 45° (see page 13).
3. Connect a heat-resistant hose to the fill valve (h). Make sure that the solar fluid being drained is collected in a heat-resistant container.
4. Open the fill valve (c) of the solar station.
5. Open a vent valve that may be present at the highest point of the solar system.
6. Dispose of the solar fluid observing the local regulations.

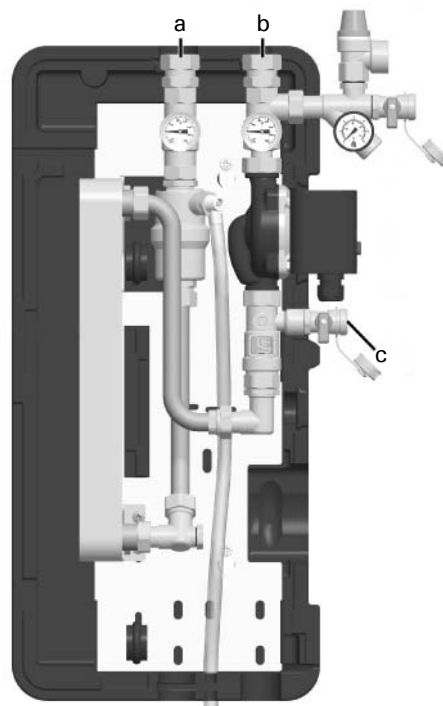


Fig. 16 Primary solar loop components

Parts

Solar-Divicon-HX

Model No. **Order No.**
DN20 7834 370

Ordering Replacement Parts:

Order replacement components from your Viessmann distributor.

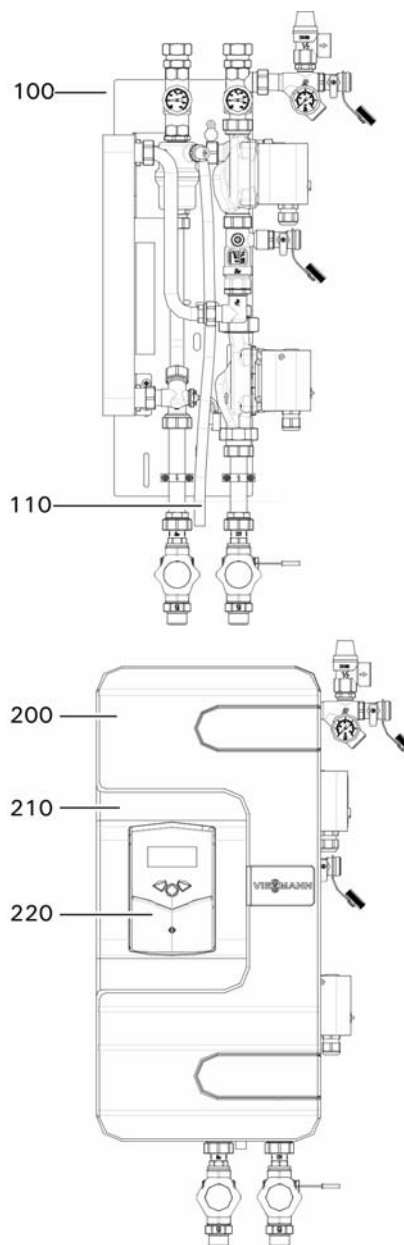
Parts

- | | |
|-----|---|
| 100 | Wall-mount bracket,
559 x 185 x 2 mm |
| 110 | Hose, transparent,
d= 10 x 2 mm |
| 200 | Insulation jacket |
| 210 | Mounting kit, SCU 123 |
| 220 | Solar Control Unit SCU 123 |

Other Parts (not illustrated)

- | | |
|-----|--|
| 400 | Installation and Service
Instructions |
| 401 | Parts List |

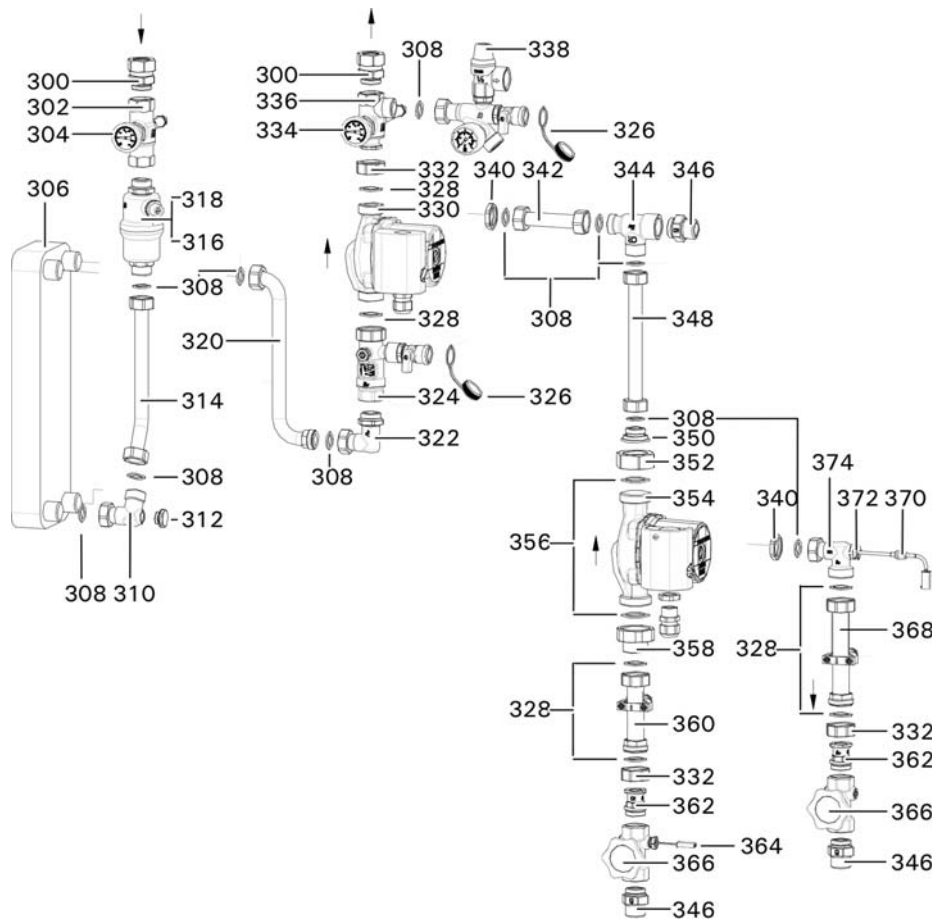
Product may not be exactly as illustrated.



Parts

Solar-Divicon-HX

- 300 Split ring compression, fitting, $\frac{3}{4}$ "
- 302 Ball valve, supply, $\frac{3}{4}$ " x $\frac{3}{4}$ "
- 304 Thermometer, 32-320°F (red)
- 306 Heat exchanger
- 308 Gasket, 24 x 17 x 2 mm
- 310 Flange elbow G, $\frac{3}{4}$ " x $\frac{3}{4}$ "
- 312 Plug, $\frac{3}{8}$ "
- 314 Stainless steel tube
- 316 Vent plug, $\frac{3}{8}$ "
- 318 Air separator
- 320 Stainless steel tube
- 322 Flange elbow, 90° x F $\frac{1}{2}$ "
- 324 Flow meter
- 326 Cap, $\frac{3}{4}$ "
- 328 Gasket, 30 x 21 x 2 mm
- 330 Solar Circulation pump
- 332 Half union, G 1"
- 334 Thermometer, 32-320°F (blue)
- 336 Ball valve, return $\frac{3}{4}$ " x $\frac{3}{4}$ "
- 338 Pressure relief valve, SV 6 bar / 87psig
- 340 Lock nut, $\frac{3}{4}$ "
- 342 Stainless steel tube, d = 18 x 1 cm
- 344 Tee, 2 x $\frac{3}{4}$ " x $\frac{3}{4}$ "
- 346 Double nipple, $\frac{3}{4}$ " with O-ring
- 348 Stainless steel tube, d = 18 x 1 cm
- 350 Flange fitting $\frac{3}{4}$ " x $\frac{3}{4}$ "
- 352 Half union, G 1 $\frac{1}{4}$ "
- 354 DHW Circulation pump Wilo S21BU
- 356 Gasket, 38 x 27 x 2 mm
- 358 Adaptor, 1 $\frac{1}{4}$ " x 1"
- 360 Stainless steel tube, d = 22 x 1.2 mm
- 362 Flange nipple, $\frac{3}{4}$ " x $\frac{3}{4}$ "
- 364 Temperature sensor
- 366 Piston valve DN20, 2 x $\frac{3}{4}$ "
- 368 Stainless steel tube, d = 22 x 1.2 cm
- 370 Temperature Sensor, PT1000
- 372 Clip, d = 8 mm
- 374 Flange elbow G $\frac{3}{4}$ " x 1"



Characteristics

Primary (solar) loop pump charts

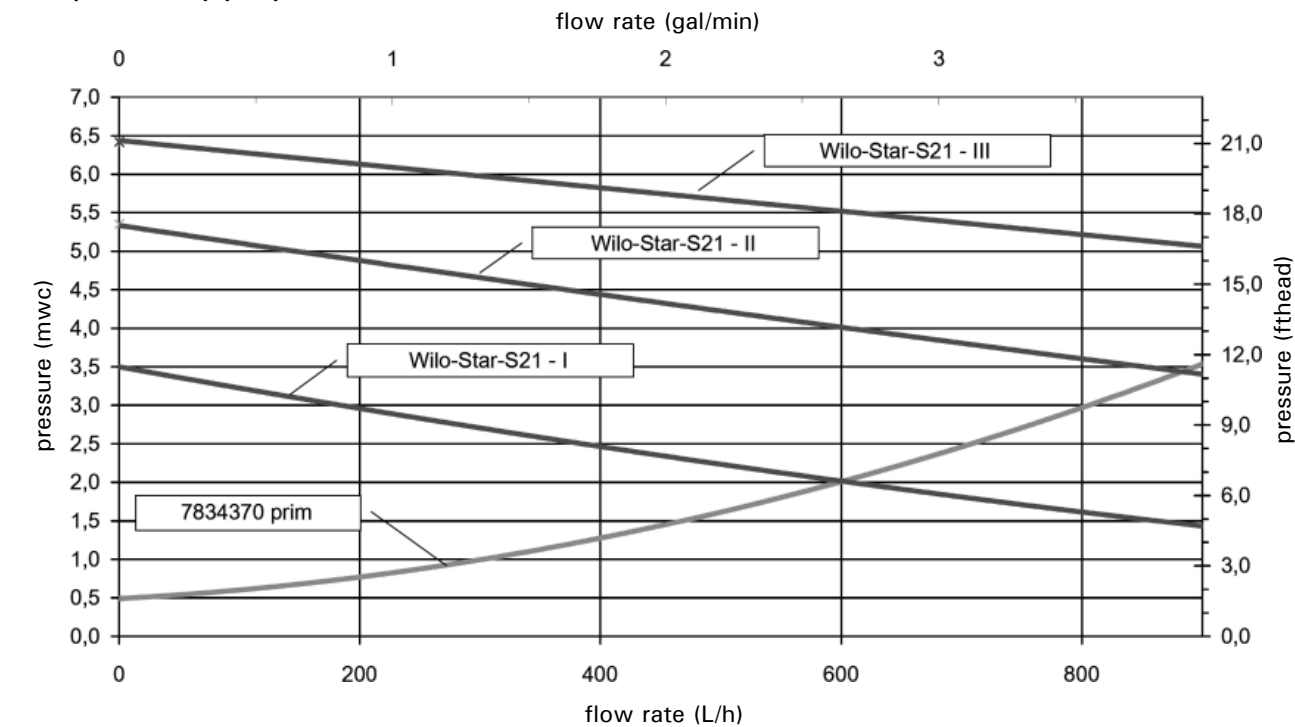


Fig. 17 Pump curve chart and friction chart - DN 20

Secondary (storage tank) loop pump chart

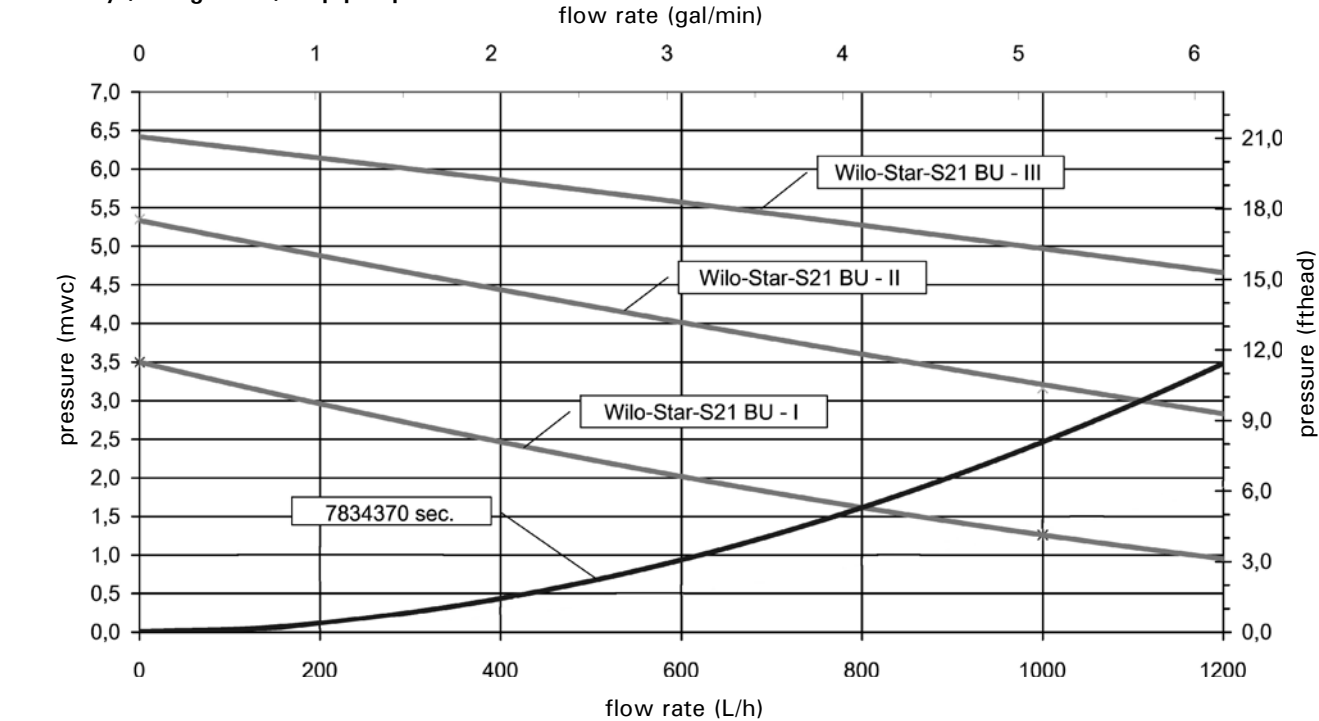
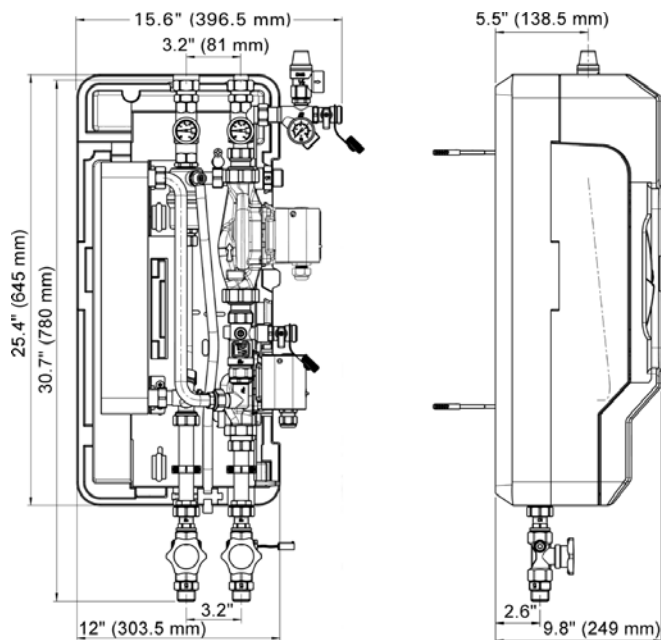


Fig. 19 Pump curve chart - DN 20

Specifications

Dimensions:	Height.....	30.7" (780 mm)
	Width (with safety equipment).....	15.6" (396 mm)
	Depth (with insulation).....	9.8" (~250 mm)
	Centre distance (supply / return).....	3.2" (81 mm)
	Pipe connections - primary loop.....	¾" copper compression
	Pipe connections - secondary loop.....	¾" male thread
	Connection for expansion tank.....	¾" male thread, flat-sealing
Operating data:	Outlet pressure relief valve.....	¾" female thread
	Max. admissible pressure (solar loop).....	87 psi (6 bars)
	Max. admissible pressure (DHW tank loop). ..	150 psi (10 bars)
	Max. operating temperature.....	248°F (120°C)
	Max. temperature short-term.....	320°F (160°C)
Equipment:	Max. propylene glycol concentration.....	50 %
	Pressure relief valve, primary loop.....	87 psi (6 bars)
	Pressure gauge.....	0 - 87 psi (0 - 6 bars)
	Check valves.....	Opening pressure 200 mm wc, can be opened manually
	Dial thermometer.....	0 - 320°F (0 - 160°C)
	Flowmeter.....	0.1 - 4.0 USgpm
	Weight.....	22.3 Kg. (49.2 lb.)
Material:	Valves and fittings.....	Housing: brass
	Plate heat exchanger.....	Plates: stainless steel 1.4400/ Solder: copper (99.99 %)
	Pipes.....	Stainless steel 1.4400
	Seals, O-rings.....	EPDM/Viton
	Seals, flat sealings.....	AFM 34, asbestos-free
	Insulation.....	EPP



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Fig. 20 Dimensions



Viessmann Manufacturing Company Inc.
750 McMurray Road
Waterloo, Ontario • N2V 2G5 • Canada
TechInfo Line 1-888-484-8643
1-800-387-7373 • Fax (519) 885-0887
www.viessmann.ca • info@viessmann.ca

Viessmann Manufacturing Company (U.S.) Inc.
45 Access Road
Warwick, Rhode Island • 02886 • USA
TechInfo Line 1-888-484-8643
1-800-288-0667 • Fax (401) 732-0590
www.viessmann-us.com • info@viessmann-us.com