

Technical Data Manual

Model Nos. and pricing: see Price List

Solar package for heating DHW with solar energy, with a dual mode DHW tank, Solar-Divicon, solar control unit, solar collectors and solar components

VIESSMANN®

VITOSOL® DHW SOLAR PACK



Product may not be exactly as shown

Vitocell 100-W, type CVBA

Floor standing steel DHW tank with Ceraprotect enamel coating and two indirect coils for heating by solar collectors and reheating by a boiler.

With pre-installed Solar-Divicon and solar control.

Vitosol 200-F, type SVK

Flat-plate collectors, optimized for this application, suitable for vertical sloped roof installation.

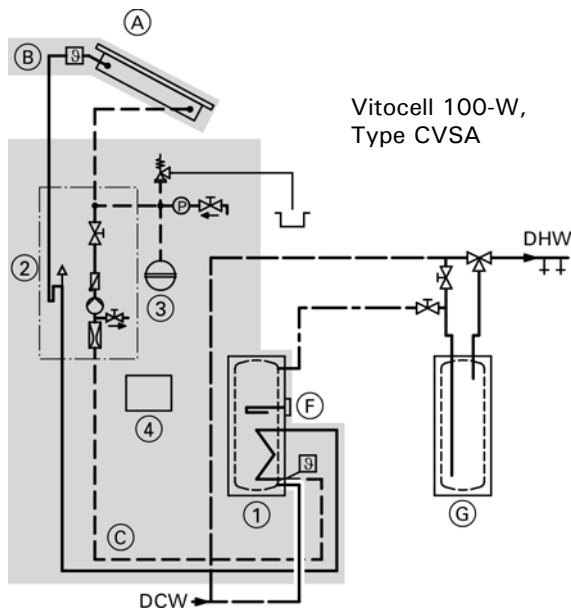
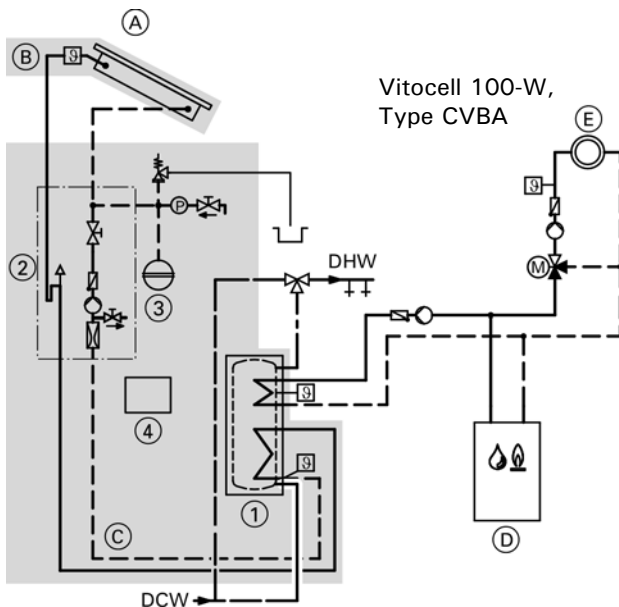
Vitocell 100-W, type CVSA

Floor standing steel DHW tank with Ceraprotect enamel coating and one indirect coil for heating by solar and one electric heating element.

With pre-installed Solar-Divicon and solar control.

Product Description

System diagram



Legend

DCW Domestic cold water

DHW Domestic hot water

Grey area = Standard delivery in solar pack

- (A) DHW solar pack:
- (B) Vitosol 200-F, type SVK, with connection set including collector temp. sensor and connection lines
- (C) Vitocell 100-W, type CVBA; 66 USG (250 L) or Vitocell 100-W, type CVSA; 69 USG (260 L)
- (1) Vitocell 100-W with integrated tank sensor
- (2) Solar-Divicon
- (3) Expansion tank
- (4) Solar controller, type DeltaSol BX

(D) Boiler

(E) Space heating circuit

(F) Electric heating element (DHW)

(G) Existing DHW tank

Benefits (DHW Solar Pack)

- Standard DHW solar pack with components tailored to heating DHW by solar energy.
- Clearly defined application range: Solar thermal system for DHW heating with two solar collectors.
- Powerful, attractively priced flat-plate collector.
- Special meander hydraulics for excellent stagnation characteristics.
- Suitable for sloped roof installation.
- High efficiency through highly selectively coated absorber and cover made from low-ferrous solar glass.
- Permanently sealed and highly stable through all-round folded aluminium frame and seamless pane seal.
- Puncture-proof and corrosion-resistant back panel made from zinc plated sheet steel.
- Easy to assemble Viessmann fixing system with structurally-tested and corrosion-resistant components.
- Quick and reliable collector connection through push fittings and flexible connection lines.
- Dual mode DHW tank fully equipped for quick and easy connection to a solar thermal system.
- Corrosion-resistant steel with Ceraprotect enamel coating. Additional cathodic protection via a consumable magnesium anode (rod style).
- Straight forward and quick installation. Fill, vent and shut-off valve as well as a solar control unit are integrated in the Solar-Divicon and pre-installed on the tank.
- Low heat losses through highly effective, all-round thermal insulation.

Delivered condition

DHW solar pack:

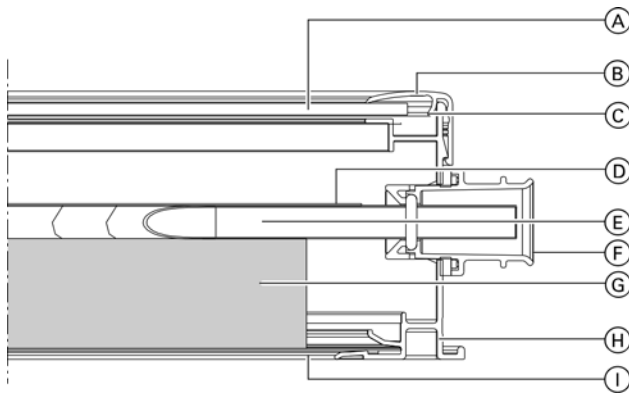
- 2 x Vitosol 200-F, type SVK. Connection set with flexible connection lines, brass connection tee with integrated sensor well
- Sloped roof mounting hardware kit
- Vitocell 100-W CVBA or CVSA with pre-mounted Solar-Divicon and solar control unit
 - Solar-Divicon with 3-speed circulation pump
 - Solar controller, type DeltaSol BX
- Solar expansion vessel 4.8 USG (18 L)
- Flexible SS connection pipe with tank mounting bracket (for expansion tank)
- Premixed Heat transfer medium 5.3 USG (20 L)

IMPORTANT

DHW recirculation line cannot be installed on the Vitosol DHW Solar Pack in a single tank configuration.

This solar tank is not provided with a recirculation tapping. If DHW recirculation is required, then you must use a two-tank system configuration.

Vitosol 200-F, SVK



Legend

- (A) Solar glass cover, 0.126" (3.2 mm)
- (B) Aluminium cover strip
- (C) Pane seal
- (D) Absorber
- (E) Meander-shaped copper pipe
- (F) Plastic meander outlet
- (G) Thermal insulation made from mineral fibre
- (H) Aluminium frame
- (I) Steel bottom plate with an aluminium-zinc coating

Type SVK for sloped roof installation

The main component of the Vitosol 200-F is the highly selectively coated absorber. It ensures a high absorption of insolation and low emission of thermal radiation.

A meander-shaped copper pipe through which the heat transfer medium flows is part of the absorber.

The heat transfer medium absorbs the absorber heat through the copper pipe. The absorber is encased in a highly insulated collector housing that minimizes the heat losses of the collector.

The high-grade thermal insulation provides temperature stability and is non-outgassing. The collector is covered with a solar glass pane with low ferrous content.

This improves the transmission of insolation.

A connection set with connection lines enables the collectors to be readily connected to the solar circuit.

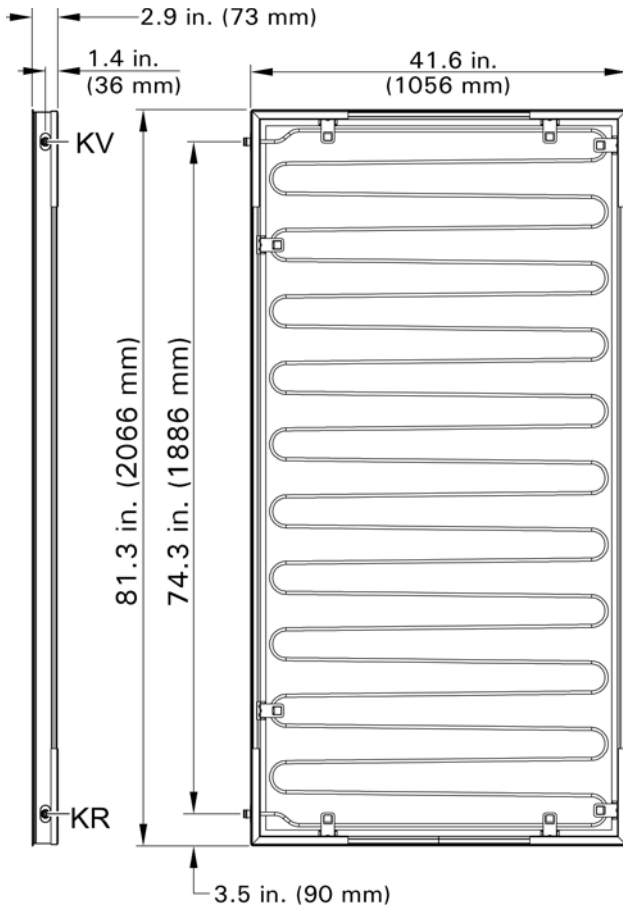
Install the collector temperature sensor in the factory supplied sensor well (part of the connection set).

Specifications

Type		SVK
Gross area	ft ² (m ²)	23.5 (2.18)
Absorber area	ft ² (m ²)	21.6 (2.01)
Aperture area	ft ² (m ²)	21.7 (2.02)
Dimensions		
Width	in. (mm)	41.6 (1056)
Height	in. (mm)	81.3 (2066)
Depth	in. (mm)	2.8 (73)
The following values apply to the absorber area: (as tested by TUV testing laboratories in Europe)		
- Optical efficiency	%	80.4
- Heat loss factor k_1	W/(m ² · K)	4.15
- Heat loss factor k_2	W/(m ² · K ²)	0.0139
Weight	lb (kg)	81.6 (37)
Liquid content (heat transfer medium)	USG (L)	0.33 (1.27)
Maximum stagnation temperature	°F (°C)	401 (205)
Permissible operating pressure	psig (bar)	87 (6)
Connection	Ø in. (Ø mm)	¾ (22)
Steam output		
- Favorable installation position	W/m ²	60
- Unfavorable installation position	W/m ²	100

Vitosol 200-F, SVK (continued)

Dimensions



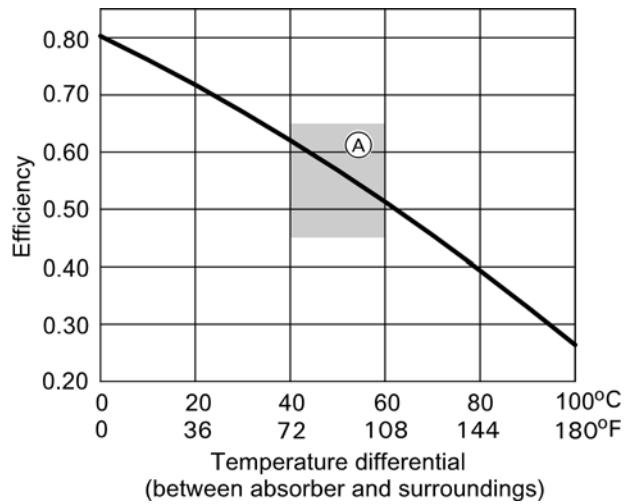
Legend

- KR Collector return (inlet)
- KV Collector supply (outlet)

Efficiency curve

The optical efficiency η_0 and the heat loss factors k_1 and k_2 together with temperature differential ΔT and the irradiance E_g are sufficient to determine the efficiency curve. Maximum efficiency is achieved when the differential between the absorber and ambient temperature ΔT and the thermal losses is zero. The higher the collector temperature, the higher the heat losses and the lower the efficiency.

The typical operating range of the collectors can be read off the efficiency curve. This gives the application options for the collector (see the following diagram).

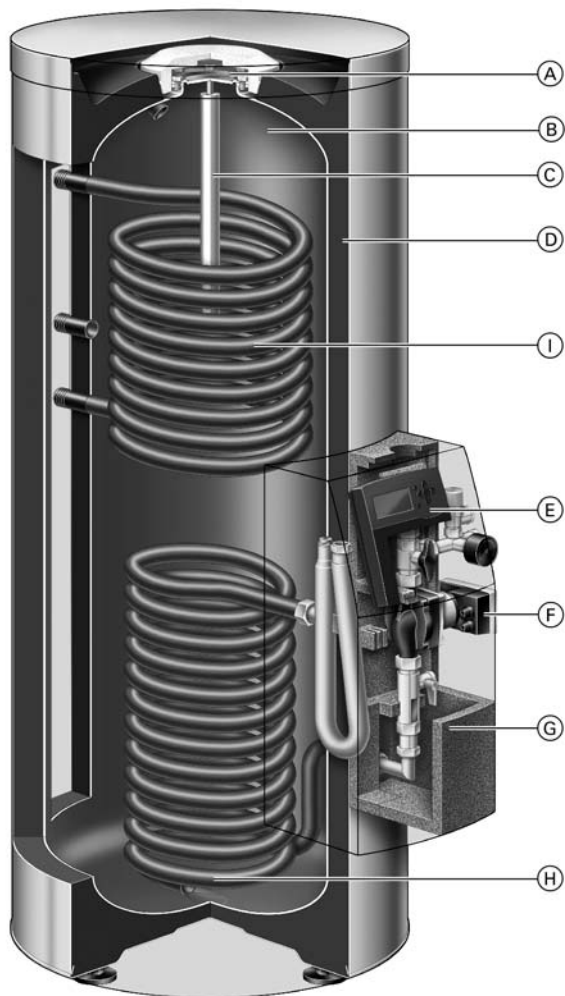


Legend

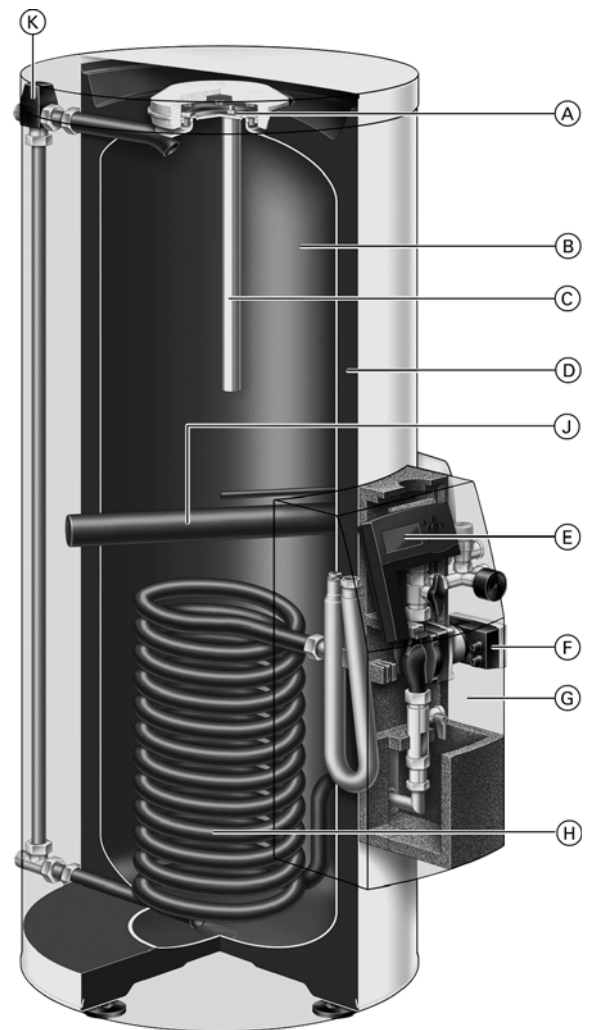
- Ⓐ Typical operating range for the solar thermal system for a residential DHW heating system

Vitocell 100-W, CVBA/CVSA

Vitocell 100-W, Type CVBA



Vitocell 100-W, Type CVSA



Product may not be exactly as illustrated.

Legend

- (A) Inspection and cleaning opening
- (B) Steel tank with Ceraprotect enamel coating
- (C) Magnesium anode
- (D) Highly effective all-round thermal insulation
- (E) Solar control unit DeltaSol BX
- (F) Solar circuit pump
- (G) Solar-Divicon pumping/control station
- (H) Lower indirect coil for connecting solar collectors
- (I) Upper indirect coil for reheating by the boiler
- (J) Immersion heater for electric reheating (wet connection)
- (K) External piping with anti-scald thermostatic mixing valve (field supplied)

Vitocell 100-W, CVBA Specifications

For DHW heating in conjunction with boilers and solar collectors. Suitable for the following systems:

- DHW temperatures up to 203°F (95°C)
- Heating water supply temperature up to 320°F (160°C)
- Solar supply temperature up to 230°F (110°C)
- Operating pressure on the heating water side up to 150 psig (10.3 bar)
- Operating pressure on the solar side up to 87 psig (6 bar)
- Operating pressure on the DHW side up to 150 psig (10.3 bar)

Tank capacity		USG (L)	66 (250)
Recovery rate, upper indirect coil	194°F (90°C)	MBH (kW)	106 (31)
For DHW heating from 50 to 113°F (10 to 45°C) and a water supply temperature of....at the supply flow rate stated below		USG/h (L/h)	201 (761)
	176°F (80°C)	MBH (kW)	89 (26)
		USG/h (L/h)	169 (638)
	158°F (70°C)	MBH (kW)	68 (20)
		USG/h (L/h)	129 (491)
	140°F (60°C)	MBH (kW)	51 (15)
		USG/h (L/h)	97 (368)
	122°F (50°C)	MBH (kW)	38 (11)
		USG/h (L/h)	71 (270)
Continuous output, upper indirect coil	194°F (90°C)	MBH (kW)	79 (23)
For DHW heating from 50 to 140°F (10 to 60°C) and a water supply temperature of....at the supply flow rate stated below		USG/h (L/h)	104 (395)
	176°F (80°C)	MBH (kW)	68 (20)
		USG/h (L/h)	91 (344)
	158°F (70°C)	MBH (kW)	51 (15)
		USG/h (L/h)	68 (258)
Supply flow rate for the stated continuous output		USG/min (m ³ /h)	13.2 (3.0)
Draw-off rate		USG/min (L/min)	3.9 (15)
Drawable water volume		USG (L)	29 (110)
Without reheating			
Tank content heated to 140°F (60°C),			
Water at t = 140°F (60°C) (constant)			
Thermal insulation			Rigid PUR foam
Standby heat loss q_{BS}		kWh/24 h	3.03
(standard parameter)		(MBH /24 h)	(0.89)
Standby capacity V_{aux}		USG (L)	26 (100)
Solar capacity V_{sol}		USG (L)	40 (150)
Dimensions (with thermal insulation and Solar-Divicon)			
Length (Ø)		in. (mm)	24.8 (631)
Total width		in. (mm)	33.8 (860)
Height		in. (mm)	58.5 (1485)
Height when tilted		in. (mm)	62.6 (1590)
Weight (with thermal insulation and Solar-Divicon)		lb (kg)	273 (124)
Total weight in operation		lb (kg)	824 (374)
Heating water content			
- Upper indirect coil		USG (L)	1.6 (6)
- Lower indirect coil		USG (L)	1.7 (6.5)
Heating surface			
- Upper indirect coil		ft ² (m ²)	9.7 (0.9)
- Lower indirect coil		ft ² (m ²)	10.8 (1.0)
Connections			
Heating water flow and return		in.	1
Cold water, DHW		in.	1
Solar-Divicon (locking ring fitting/double O-ring)		in. (mm)	¾ (22)

Information regarding continuous output of the upper indirect coil

When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output \geq continuous output.

For specifications on the Solar Divicon, see page 11.

Vitocell 100-W, CVSA Specifications

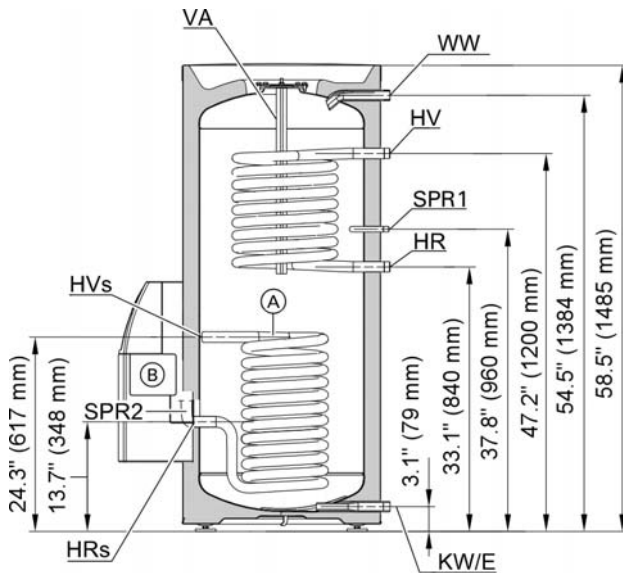
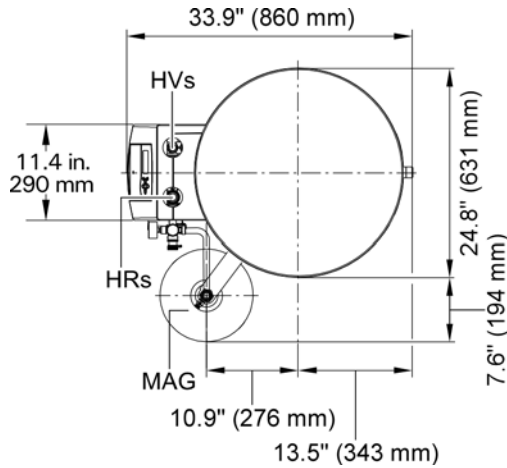
For DHW heating in conjunction with boilers and solar collectors. Suitable for the following systems:

- DHW temperatures up to 203°F (95°C)
- Solar supply temperature up to 230°F (110°C)
- Operating pressure on the solar side up to 87 psig (6 bar)
- Operating pressure on the DHW side up to 150 psig (10.3 bar)

Tank capacity	USG (L)	69 (260)
Electric immersion element		
Phase	PH	1
Voltage	VAC	240
Watts (element)	W	4500
Amps	A	20
*Overcurrent protection: 25A for 240VAC		
Thermal insulation		Rigid PUR foam
Standby heat loss q_{BS} (standard parameter)	kWh/24 h (MBH /24 h)	3.03 (0.89)
Standby capacity V_{aux}	USG (L)	26 (100)
Solar capacity V_{sol}	USG (L)	40 (150)
Dimensions (with thermal insulation and Solar-Divicon)		
Length (Ø)	in. (mm)	25.6 (650)
Total width	in. (mm)	33.8 (860)
Height	in. (mm)	58.5 (1485)
Height when tilted	in. (mm)	62.6 (1590)
Weight (with thermal insulation and Solar-Divicon)	lb (kg)	275 (125)
Total weight in operation	lb (kg)	824 (374)
Heating water content		
- Lower indirect coil	USG (L)	1.7 (6.5)
Heating surface		
- Lower indirect coil	ft ² (m ²)	10.8 (1.0)
Connections		
Cold water, DHW	in.	1
Solar-Divicon (locking ring fitting/double O-ring)	in. (mm)	¾ (22)

For specifications on the Solar Divicon, see page 11.

Vitocell 100-W, CVBA Dimensions



Legend

- Ⓐ Lower indirect coil for connecting solar collectors
The connections HV_S and HR_S are located on the Solar-Divicon
- Ⓑ Solar-Divicon with DeltaSol BX
- E Drain
- HR Heating water return
- HR_S Heating water return, solar thermal system
- HV Heating water supply
- HV_S Heating water supply, solar thermal system
- KW Cold water
- MAG Expansion vessel (can be mounted on the DHW tank or on a wall)
- SPR1 Tank temperature sensor of the DHW temperature controller (by others)
- SPR2 Solar thermal system tank temperature sensor
- VA Magnesium anode
- WW DHW

Performance factor NL

To DIN 4708.

Upper indirect coil.

Tank storage temperature T_{cyl} = cold water inlet temperature + 50 K (+ 5 K/-0 K).

Performance factor NL at heating water supply temperature of:

194 °F (90 °C)	1.6
176 °F (80 °C)	1.5
158 °F (70 °C)	1.4

Information regarding performance factor NL

The performance factor NL depends on the tank storage temperature T_{cyl}.

Standard values

- T_{cyl} = 60 °C → 1.0 × NL
- T_{cyl} = 55 °C → 0.75 × NL
- T_{cyl} = 50 °C → 0.55 × NL
- T_{cyl} = 45 °C → 0.3 × NL

Peak output (over 10 minutes)

Relative to the performance factor NL.

DHW heating from 50 to 113 °F (10 to 45 °C).

Peak output (USG/10 min) at a heating water supply temperature of:

194 °F (90 °C)	45 USG (172 L)
176 °F (80 °C)	44 USG (168 L)
158 °F (70 °C)	43 USG (164 L)

Max. draw-off rate (over 10 minutes)

Relative to the performance factor NL.

With reheating.

DHW heating from 50 to 113 °F (10 to 45 °C).

Max. draw-off rate (USG/min) at heating water supply temperature of:

194 °F (90 °C)	4.5 USG/min (17 L/min)
176 °F (80 °C)	4.5 USG/min (17 L/min)
158 °F (70 °C)	4.2 USG/min (16 L/min)

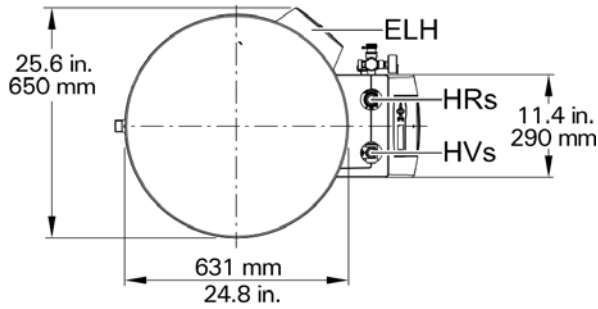
Heat-up time

The heat-up times specified will be achieved if the max. continuous output of the DHW tank is made available at the respective heating water supply temperature and when heating DHW from 50 to 140 °F (10 to 60 °C).

Heat-up time (min.) at heating water supply temperature of:

194 °F (90 °C)	16 min
176 °F (80 °C)	22 min
158 °F (70 °C)	30 min

Vitocell 100-W, CVSA Dimensions

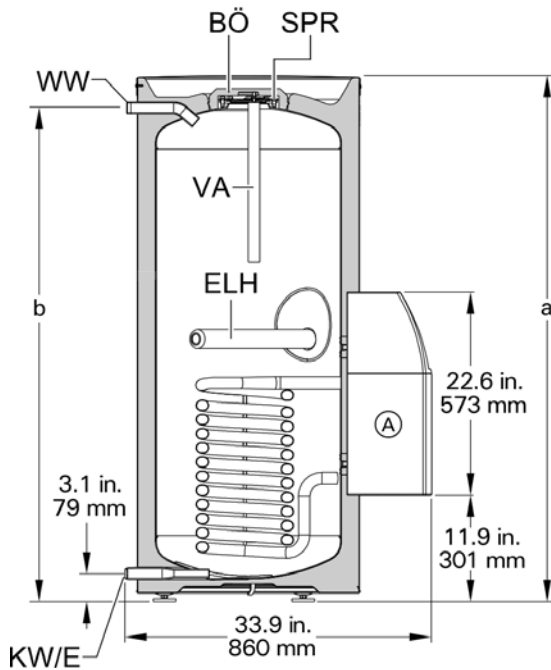


Dimensions	
Tank capacity	69 USG (260 L)
a	58.5 in. (1485 mm)
b	54.5 in. (1384 mm)

Drawable water volume

Entire cylinder contents heated to 140°F (60°C)
Without reheating

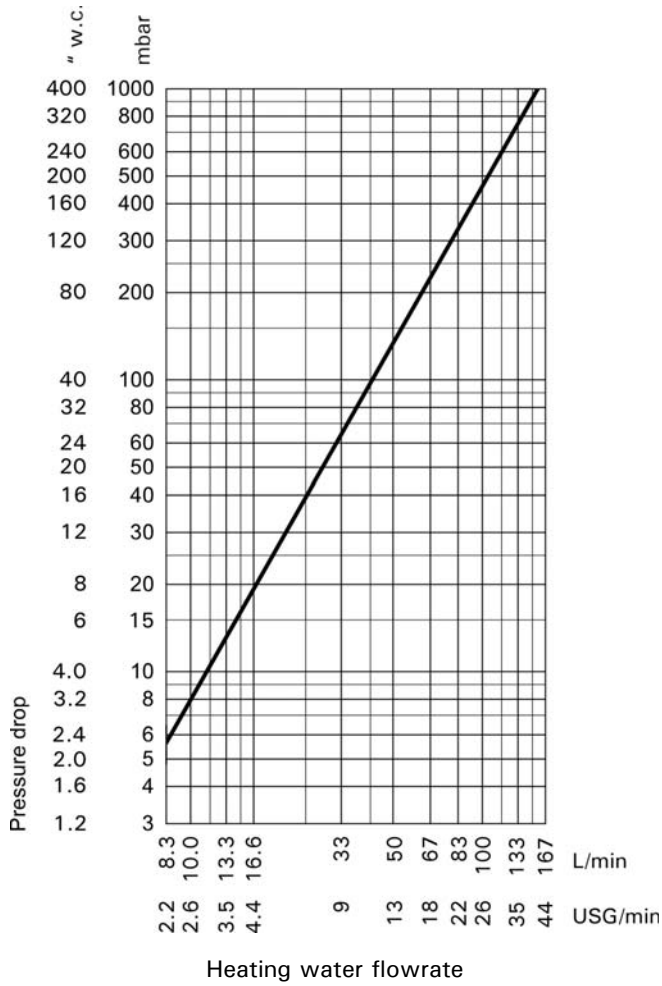
Performance factor NL at heating water supply temperature of:	
Tank capacity	69 USG (260 L)
Draw-off rate	4 USG (15 L/min)
Drawable water volume Water at t = 140°F (60°C) (constant)	60 USG (228 L)



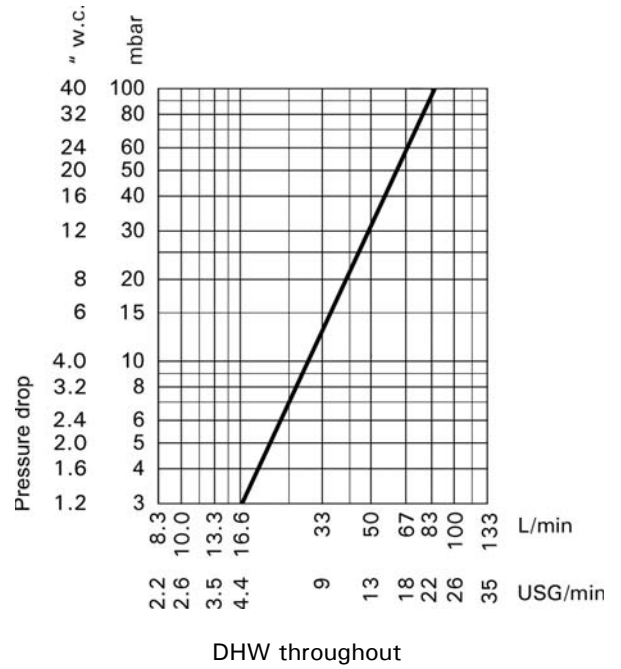
Legend

- Ⓐ Solar-Divicon with DeltaSol BX
- BÖ Inspection and cleaning aperture
- E Drain outlet
- ELH Electric immersion heater (wet connection)
- HRs Heating water return, solar thermal system
- HVs Heating water supply, solar thermal system
- KW Cold water
- SPR Cylinder temperature sensor
- VA Protective magnesium anode
- WW DHW

Vitocell 100-W, CVBA/CVSA Pressure Drop



Pressure drop on the heating water side, upper indirect coil, (only applies to the CVBA tank)



Pressure drop on the DHW side, (CVBA and CVSA tanks)

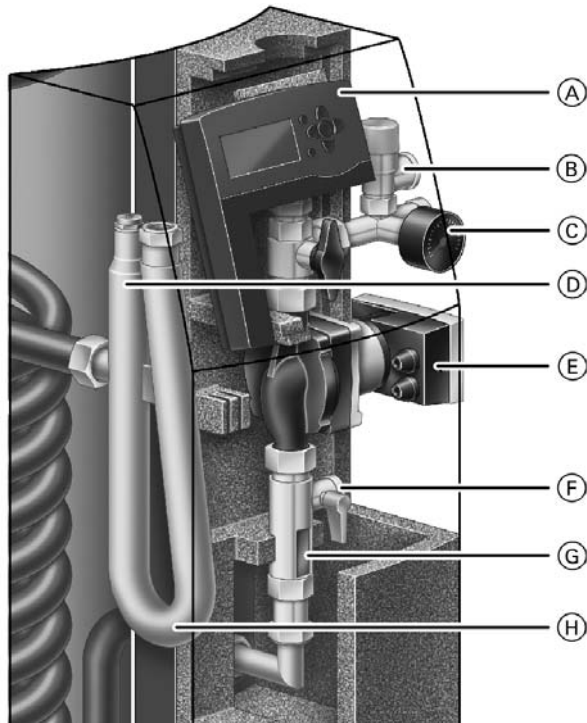
Solar Divicon

Specifications, Solar Divicon

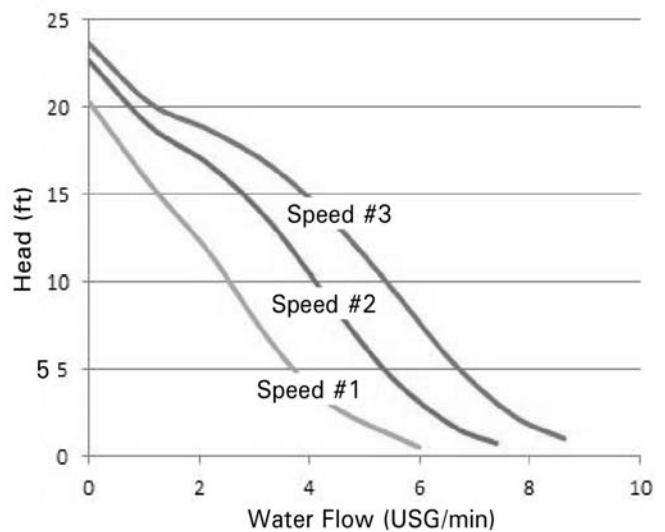
The Solar-Divicon is supplied with a 3 speed solar circuit pump.

Specifications

Circulation pump (Grundfos)		15-68 130
Rated voltage	VAC	115
Power consumption at		
- Output stage 1 (speed #1)	W	50
- Output stage 2 (speed #2)	W	62
- Output stage 3 (speed #3)	W	70
Maximum flow rate	USG/min (L/min)	8 (30)
Maximum head	ft. (m)	23.5 (7.2)
Flow indicator (flow meter)	USG/min (L/min)	0.5 to 4 (2 to 15)
Solar safety valve (pressure relief valve)	psig (bar)	87 (6)
Max. operating temperature	°F (°C)	230 (110)
Max. operating pressure	psig (bar)	87 (6)
Solar circuit connections (compression fittings)	Ø mm	22
Solar expansion tank connection	Ø in.	3/4
Safety relief valve connection	Ø in.	3/4



Grundfos Solar 15-68 130 - 3 Speed Circulating Pump



Legend

- (A) Solar control
- (B) Pressure relief valve
- (C) Pressure gage
- (D) Manual air vent
- (E) Circulation pump
- (F) Flush and fill port
- (G) Flow meter
- (H) U-tube thermosiphon trap

Solar Divicon *(continued)*

Specification, Viessmann DeltaSol BX Solar Control

Design

- LCD Screen
- Selector keys
- Terminals
 - Sensor inputs (7)
 - Relay outputs (4)
 - VBus accessories
 - Power supply (on-site ON/OFF switch)
- PWM output for switching the solar circuit pump
- Relay for actuating pumps and valves
- V40 flowmeter
- SD Card slot

Function

- Switching the solar circuit pump for DHW heating.
- Electronic limiter for the temperature in the tank (safety shutdown at 195°F (90°C)).
- Collector emergency shutdown.
- Heat metering by measuring the temperature differential and input of the flow rate.
- Display of the hours run by the solar circuit pump.
- Thermostat function:
 - This function ensures that excess heat is transferred at the earliest opportunity.
 - This function can be used independantly of the solar operation, and can be time controlled.
- Variable speed control of the solar circuit pump (30% - 100%) based on collector loop ΔT .
- Multiple system configurations possible for 1 or 2 tanks, 2nd ΔT , heat dumps, etc.
- Collector cooling and night time tank cooling functions.
- Datalogging to SD Card.

Collector temperature sensor

Standard delivery of collector connection set.

For the connection inside the appliance.

On-site extension of the connecting lead:

- 2-core copper lead, length up to 197 ft. (60 m) with cross section of 0.0023 in² (1.5 mm²).
- Never route this lead immediately next to live 115/230VAC cables.

Cable length	8 ft (2.5 m)
IP rating	IP 32 to EN 60529, ensure through design/installation
Sensor type	PT1000
Permissible ambient temperature	
– During operation	– 58 to 356°F (– 50 to +180°C)
– During storage and transport	– 4 to 158°F (– 20 to +70°C)

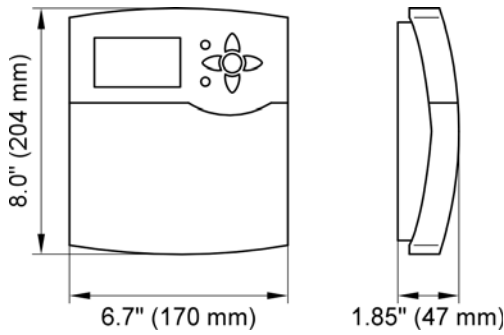
Tank temperature sensor

The sensor is connected to the control unit and built into the DHW tank.

IP rating	IP 32
Sensor type	PT1000
Permissible ambient temperature	
– During operation	23 to 180°F (– 5 to +80°C)
– During storage and transport	– 4 to 158°F (– 20 to +70°C)

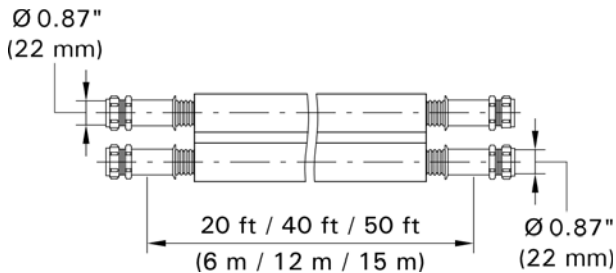
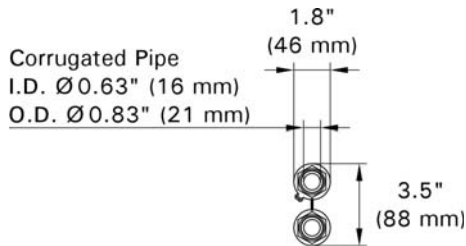
Solar Divicon *(continued)*

Specification, Viessmann DeltaSol BX Solar Control



Rated voltage	115VAC
Rated frequency	60 Hz
Rated current	4A
Power consumption	2 W
Safety category	I
IP rating	IP 20 to EN 60529, ensure through design/installation
Mode of operation	Type 1.B.C.Y
Permissible ambient temperature	
– During operation	32 to +104°F (0 to +40°C) use in the living space or boiler room (standard ambient conditions)
– During storage and transport	–4 to +149°F (–20 to +65°C)
Rated relay output breaking capacity	
– Semi-conductor relays (R1-R3)	1A
– Relay (R4)	1A
– Total	max. 4A

Accessories

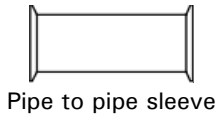


Solar supply and return line

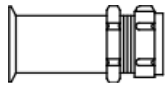
Stainless steel corrugated pipes with thermal insulation and protective foil, locking ring fittings and sensor lead:

- 20 ft (6 m) long
Part no. 7511 567
- 40 ft (12 m) long
Part no. 7511 568
- 50 ft (15 m) long
Part no. 7511 569

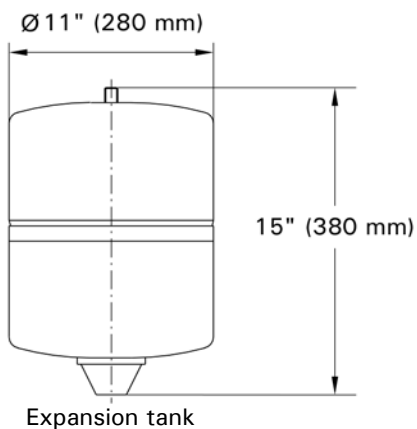
Accessories *(continued)*



Pipe to pipe sleeve



Pipe sleeve w locking ring



Expansion tank

Connection accessories for solar supply and return lines

Connecting Kit (splice fittings)

For extending the stainless steel corrugated pipes:

- 2x pipe sleeves
- 8x O-rings
- 4x support rings
- 4x profile clamps

Connection set with locking ring fitting

For joining the stainless steel corrugated pipes to the 22mm fittings of the solar thermal system:

- 2x pipe sleeves with locking ring fitting
- 4x O-rings
- 2x support rings
- 2x profile clamps

Solar expansion vessel

Capacity	4.75 USG (18 L)
Diameter	11" (280 mm)
Height	15" (380 mm)
Connection	R $\frac{3}{4}$
Weight	16.5 lbs. (7.5 Kg)

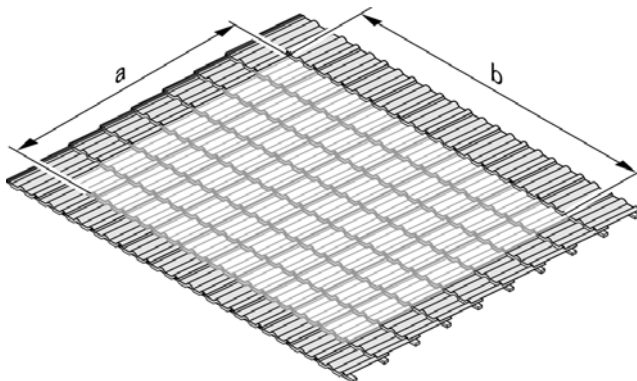
Vitosol 200-F, SVK Engineering Information

Note: The solar thermal system will generate approximately half of the energy required for DHW heating in a 4-person household.

Please observe the "solar collectors" chapter in this technical guide.

Application options for a 2 to 4 person household:

- New build
- Existing buildings



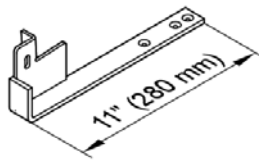
Required roof area:
 a = 86.6" (2200 mm)
 b = 90.5" (2300 mm)

Pitched roof installation — sloped roof installation

The Viessmann Vitosol 200-F, type SVK flat-plate collector is designed specifically for this type of installation.

In above roof systems, the collectors and the roof frame are connected. At each fixing point, a roof bracket penetrates the water-carrying level below the collector. This requires a completely rain-proof and safe anchorage. The fixing points and therefore also any possible defects will no longer be visible post installation. Maintain the minimum clearances from the roof edge in accordance with local codes.

Vitosol 200-F, SVK Engineering Information *(continued)*

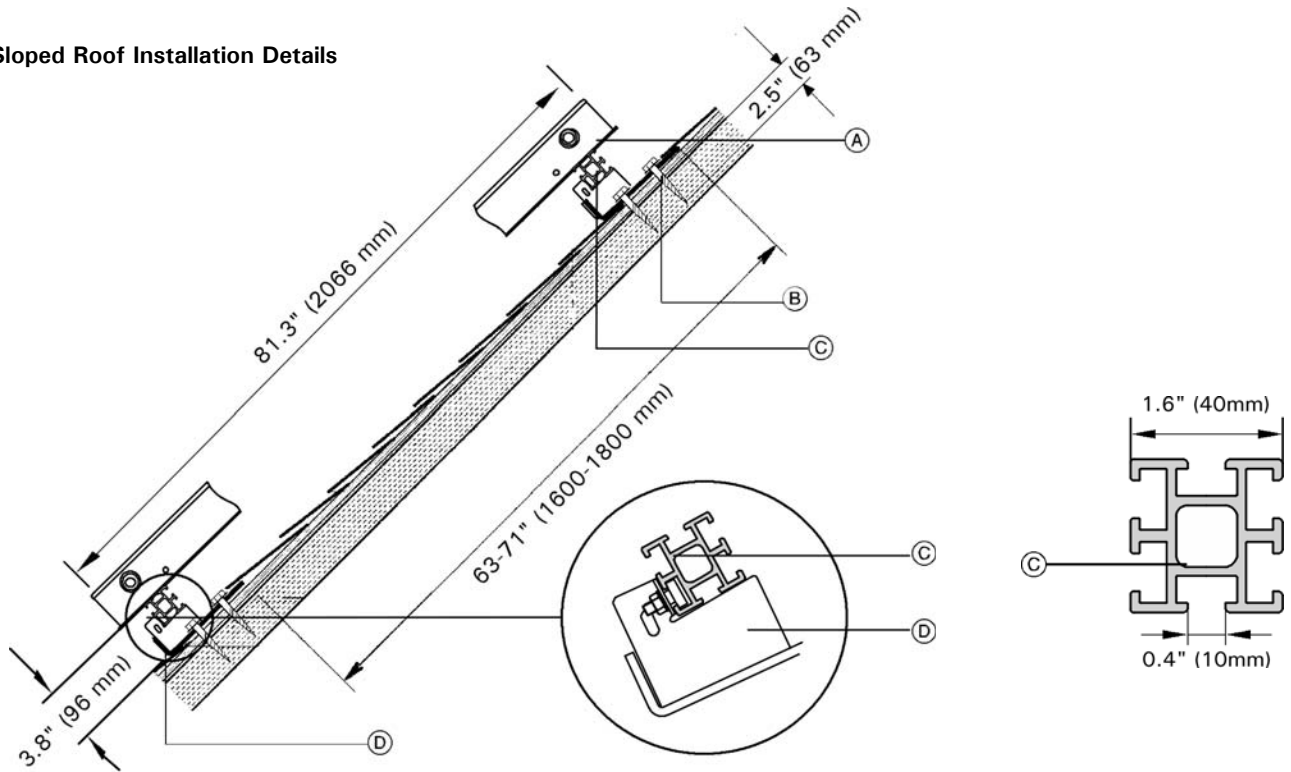


Roof bracket for shingled roofs

Sloped roof installation with roof brackets

- This fixing system is designed for shingled or slate roofs.
- The fixing system comprises roof brackets, mounting rails, clamping brackets and screws.
- Forces are applied to the roof structure in various ways, including via the roof brackets and the roof cover.

Sloped Roof Installation Details



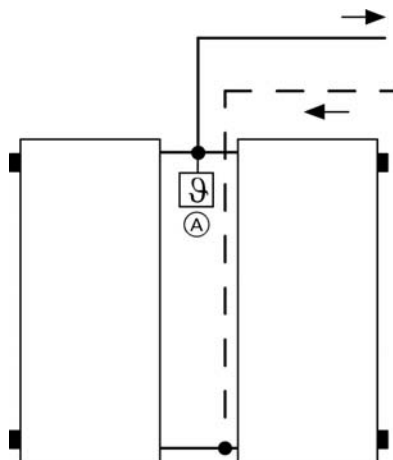
Legend

- Ⓐ Collector
- Ⓑ Lag bolt
- Ⓒ Mounting rail
- Ⓓ Roof bracket

Installation

Hydraulic connection lines are routed below the roof.

- Sloped roof installation:



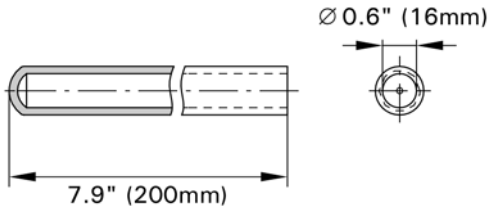
Legend

- Ⓐ Collector temperature sensor in the supply line

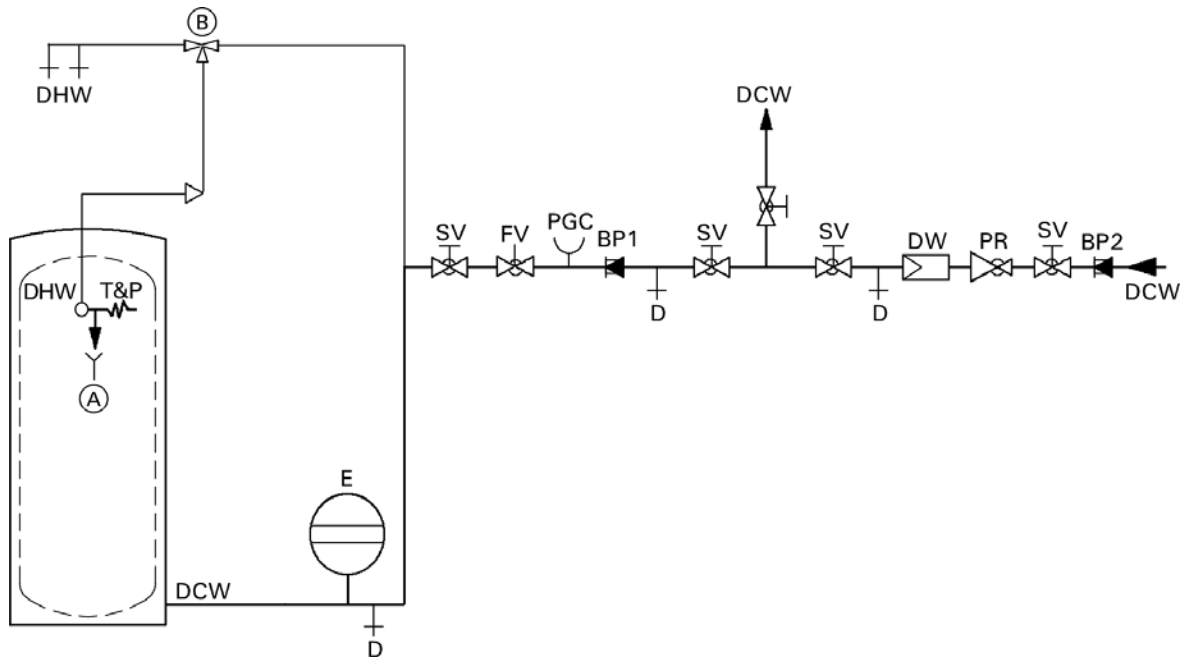
Vitocell 100-W Engineering Information

Sensor Well

The sensor well is welded into the DHW Tank



Connection on the domestic hot water side



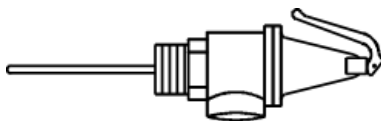
Legend

- (A) Discharge pipe
- (B) Anti-scald tempering valve (field supplied)
- SV Shut-off valve
- FV Flow check valve
- PR Pressure reducing valve
- D Drain
- DCW Cold water supply lines
- PGC Pressure gage connection
- E Precharged expansion tank (required where backflow preventer is installed; check local plumbing codes and requirements)
- BP1 Backflow preventer
- BP2 Backflow preventer
- T&P Temperature and pressure relief valve
- DW Water filter
- DHW Domestic hot water supply

Safety Valve - Temperature and Pressure

A temperature and pressure relief valve (T + P valve) is supplied with the tank. The heating contractor must install the valve on each tank in a method meeting code requirements.

- Relief pressure: 150 psig (10 bar)
- Relief temperature: 210°F (99°C)



Vitocell 100-W Engineering Information *(continued)*

Drinking water filter

According to DIN 1988-2, a drinking water filter should be installed in systems with metal pipework. We recommend the installation of a drinking water filter, even with plastic pipework. This prevents the ingress of dirt into the DHW system.

Intended use

The appliance is only intended to be installed and operated in sealed closed loop systems that comply with SRCC OG-300, with due attention paid to the associated installation, service and operating instructions. DHW tanks are only designed to store and heat water of potable water quality. Heating water buffer tanks are only designed to hold fill water of potable water quality. Only operate solar collectors with the heat transfer medium approved by the manufacturer.

Intended use presupposes that a fixed installation in conjunction with permissible, system-specific components has been carried out.

Commercial or industrial usage for a purpose other than heating the building or DHW shall be deemed inappropriate.

Any usage beyond this must be approved by the manufacturer for the individual case.

Incorrect usage or operation of the appliance (e.g. the appliance being opened by the system user) is prohibited and results in an exclusion of liability.

Incorrect usage also occurs if the components in the system are modified from their intended use (e.g. through direct DHW heating in the collector).

Adhere to local statutory regulations, especially concerning the hygiene of potable water.