



# ECObasic Solar Cylinder



Figure 1 ECObasic solar cylinder

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# 1. Technical Information

## Contents of Kit

The ECObasic solar cylinder is supplied standing and screwed down on a pallet. The insulation is glued on, fixed to the cylinder and cannot be removed. It is surrounded by a protective PVC hull with additional soft PU insulation foam. Before commencing, please check that all components in table 3 are present.

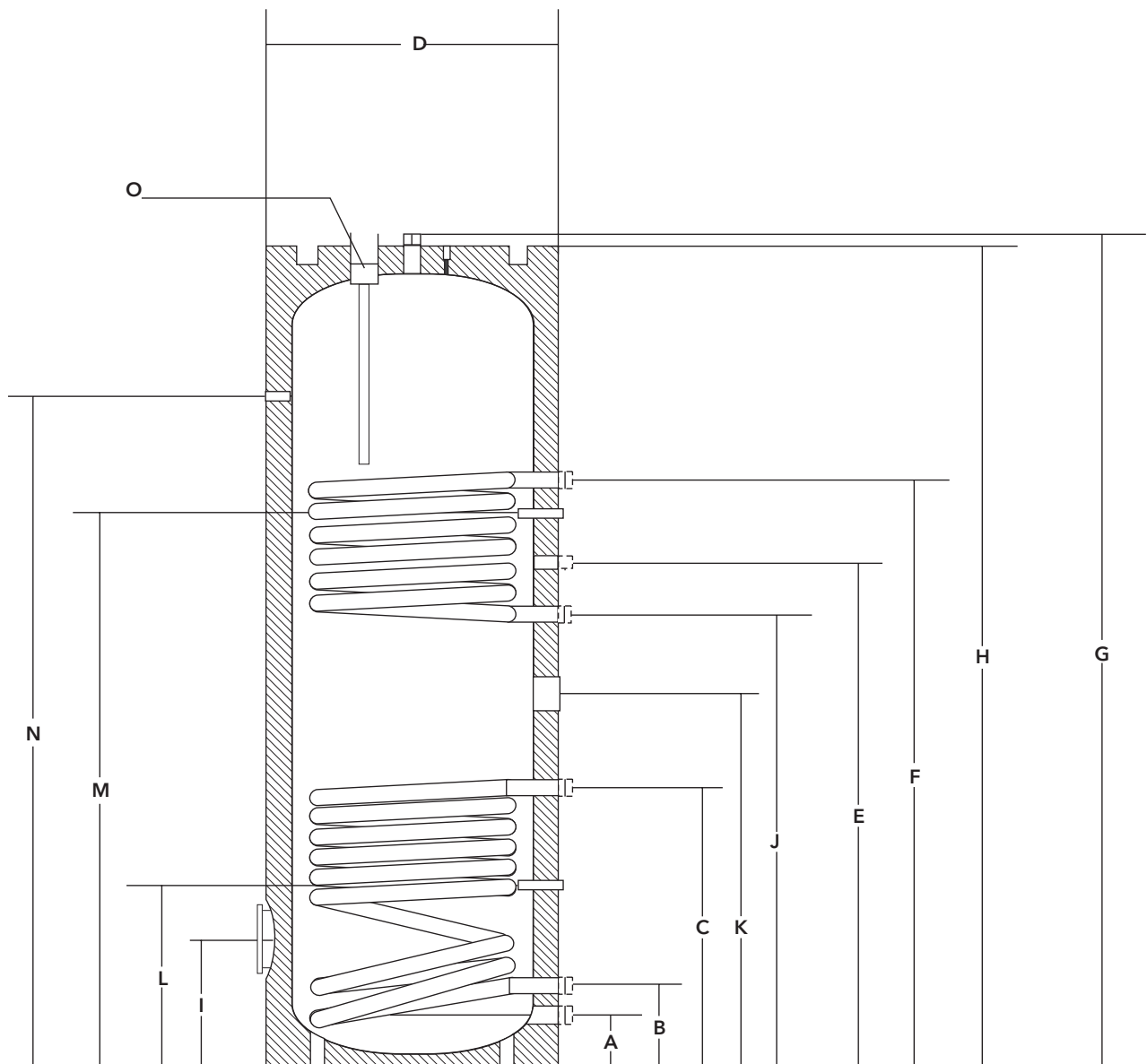


Figure 2 ECObasic solar cylinder / Installation measurements (drawing not to scale)

<b>Table 1 Technical Data</b>	ECObasic 200	ECObasic 300	ECObasic 400	ECObasic 500
Order number	130 140 81	130 140 82	130 140 83	130 140 84
Volume domestic water (litre)	199	286	394	498
Auxiliary heating volume above connection D (litre)	64	99	127	168
Maximal allowed pressure (bar)	10			
Maximal allowed temperature (°C)	95			
Total height including insulation (mm) <b>H</b>	1232	1697	1660	1783
Tilting height including insulation (mm)	1396	1827	1816	1952
Diameter including insulation and PVC hull (mm) <b>D</b>	610	610	710	760
Total weight including insulation (kg)	approx. 85	approx. 114	approx. 166	approx. 215
Cold and hot water connections 1" male <sup>3</sup> (mm) <b>A/G</b>	110 / 1257	110 / 1722	127 / 1685	128 / 1808
Circulation return ¾" male <sup>3</sup> (mm)	880	1045	1065	1125
Access flange, opening diameter = 110mm (mm) <b>I</b>	272	272	278	285
Socket for electric heating coil 1 ½" female <sup>3</sup> (mm) <b>K</b>	705	770	770	870
Anode 1 ¼" female <sup>3</sup> <b>O</b>	Dimensioning in accordance with DIN 4753			
Analogue thermometer (mm) <b>N</b>	919	1384	1325	1441
Collector temperature sensor positioning (mm) <b>L</b>	330	380	420	445
Auxiliary heating temperature sensor pos. (mm) <b>M</b>	930	1146	1166	1225
<b>Performance data</b>				
Insulation material (glued on PU foam; PVC wrapping with zipper Thickness of insulation, incl. PVC-hull: 55 mm)				
Heat losses according to DIN EN V 12977 -3 <sup>1</sup> W/K	< 2,3	< 2,8	< 3,2	< 3,6
<b>Solar heat exchanger</b> (High quality steel St 37-2; welded to the cylinder)				
Solar flow / return connections ¾" male <sup>3</sup> (mm) <b>B/C</b>	180 / 630	180 / 580	205 / 635	205 / 685
Heat exchanger surface area (m <sup>2</sup> )	0,8	1,2	1,5	1,8
Maximum allowed pressure (bar)	16			
Maximum allowed temperature (°C)	110			
Volume of water contained in exchanger (litre)	5,7	7,5	9,4	11,3
Recommended collector area (m <sup>2</sup> )	up to 5 m <sup>2</sup>	up to 7 m <sup>2</sup>	up to 9 m <sup>2</sup>	up to 13 m <sup>2</sup>
<b>Auxiliary heating heat exchanger</b> (High quality steel St 37-2; welded to the cylinder)				
Performance index NL / related boiler output <sup>2</sup> -/kW	1,4 (10)	1,8 (14)	2,1 (17)	2,5 (21)
Continuous performance <sup>2</sup> litre/h	460	605	720	830
Aux.heat. flow / return conn. ¾" male <sup>3</sup> (mm) <b>J/F</b>	780 / 990	945 / 1215	965 / 1261	1020 / 1325
Heat exchanger surface area (m <sup>2</sup> )	0,6	0,8	1,0	1,2
Maximum allowed pressure (bar)	16			
Maximum allowed temperature (°C)	110			
Volume of water contained in exchanger (litre)	3,8	5,0	6,3	7,5
Remarks: <sup>1</sup> Calculations according to DIN EN V 12977 - T3: Temperature of entire cylinder = 60 °C, ambient temperature = 15 °C; <sup>2</sup> Calculations according to DIN 4708, relative to auxiliary heat exchanger, if temperature of the cylinder is set at 60 °C, the supply temperature is 45 °C, the boiler flow and return temperatures are 80 °C and 60 °C; <sup>3</sup> Threads according to DIN ISO 228-1, flat tightening				

Table 2 Accessories	Part Numbers
ECObasic connection set "combi", 4x combi fitting ¾" x 18, 2 x combi fitting 1", cap and seals	Art.-Nr. 139 000 66
Cylinder safety unit S22 including safety valve 10 bar, one-way valve, - 22 mm soldering connection fittings - ¾" connection with screw thread	Art.-Nr. 130 100 56 Art.-Nr. 139 000 35
CORREX-UP anode, maintenance-free corrosion protection, 230V, consumption 2.5 kWh per year	Art.-Nr. 130 101 26
Circulation pump BW 152, including ball valves and one-way valve, connection ½" male or soldering to 15mm copper pipe	Art.-Nr. 160 102 14
Immersion Heater, 3 kW / 230 V / 400 V or 6.0 kW / 400 V Immersion depth 500 mm or 620 mm (check cylinder diameter before ordering!)	3 kW: Art.-Nr. 130 101 66 6 kW: Art.-Nr. 130 101 65
Thermostatic mixer, up to 55 °C - 22 mm soldering connection fittings - ¾" connection with screw thread	Art.-Nr. 100 89 Art.-Nr. 150 300 75

### Recommended System Solutions

Some system solutions including allocation of connections are documented in the following figures.

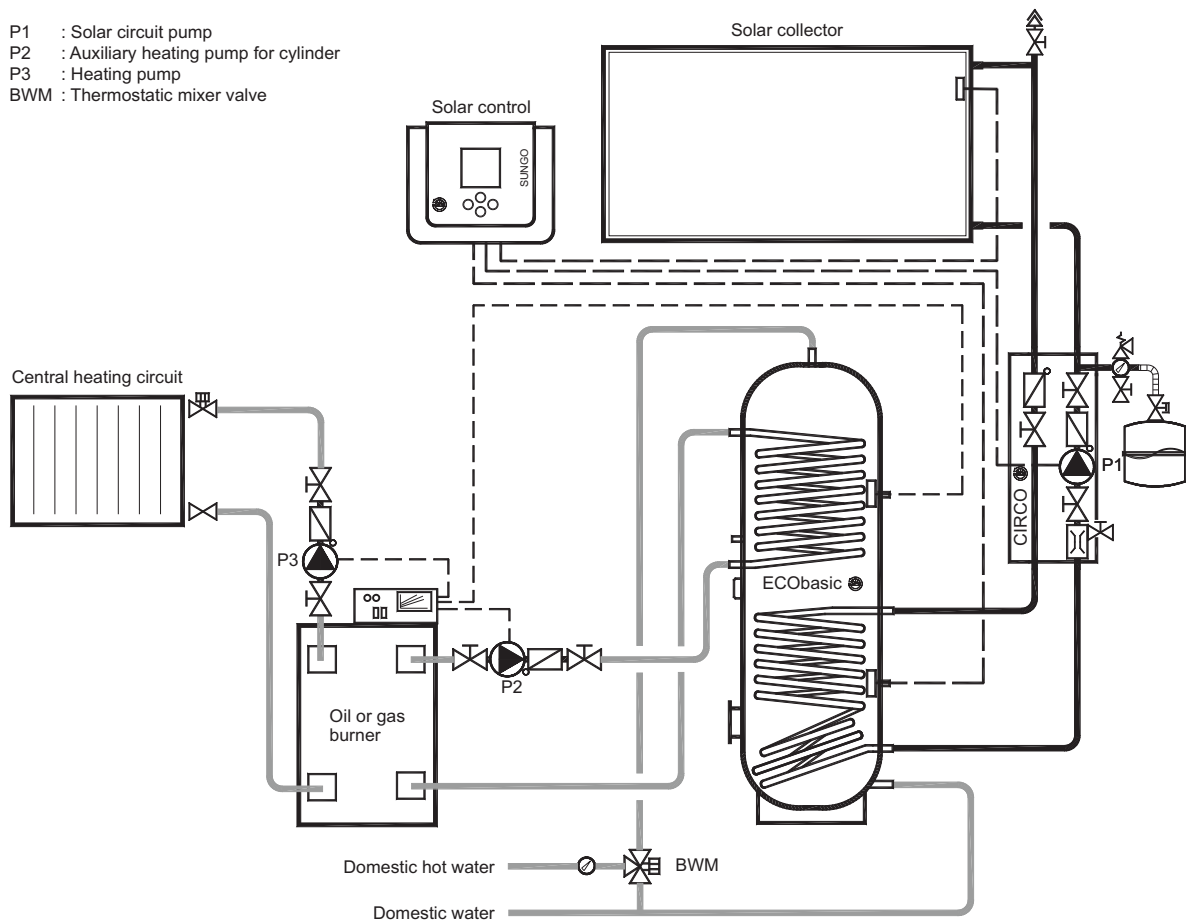


Figure 3 Solar system to heat domestic hot water. Single storage system with ECObasic cylinder and auxiliary heating with gas, oil etc. The SUNGO control controls the speed of solar circuit pump in dependence of solar radiation and cylinder temperature. This ensures continues operation and reduced electricity consumption of the pump.

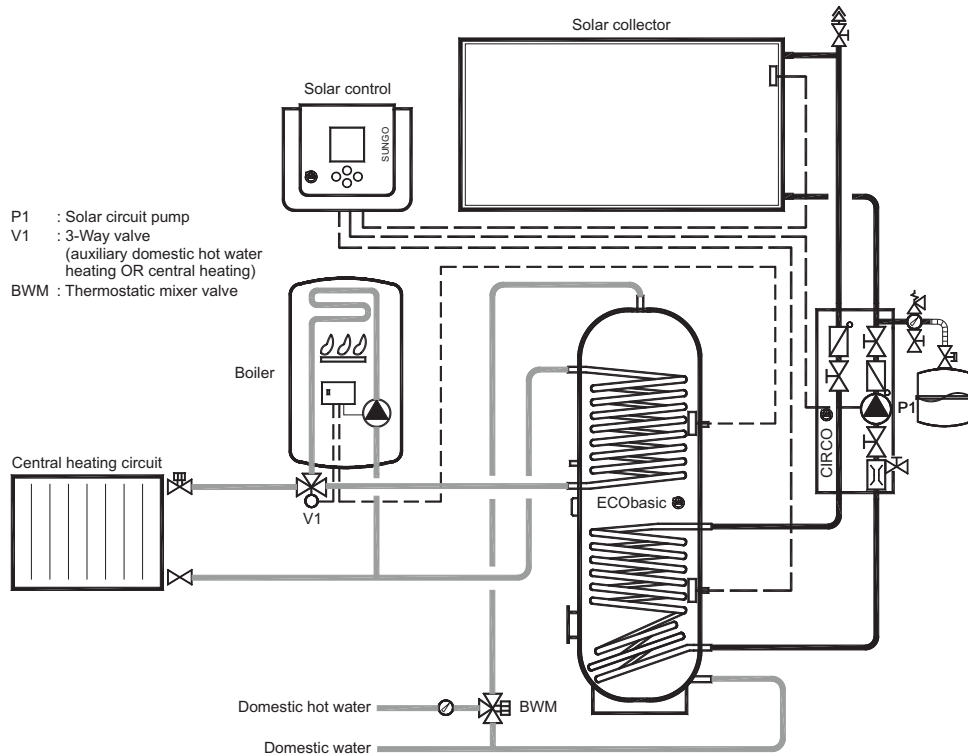


Figure 4 Solar system to heat domestic hot water. Single storage system with ECObasic cylinder and a wall-mounted condensing gas boiler. The shifting between central heating service and auxiliary domestic hot water heating is done by the 3-way valve, which is mounted in the flow pipe. The governing is done by the central heating controller. The SUNGO control controls the speed of solar circuit pump in dependence of solar radiation and cylinder temperature. This ensures continues operation and reduced electricity consumption of the pump.

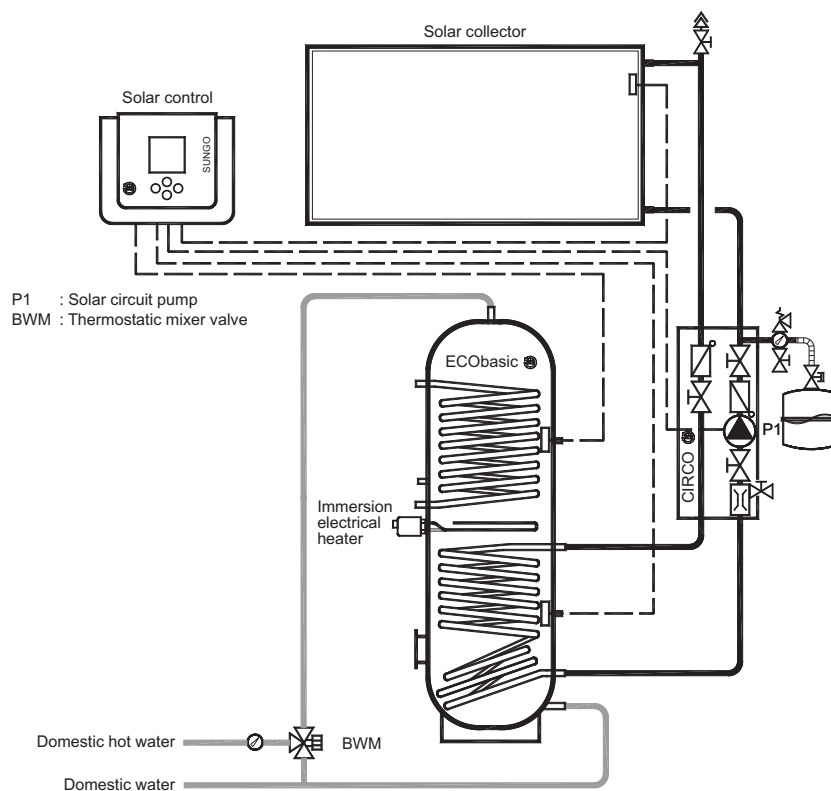


Figure 5 Solar system to heat domestic hot water. Single storage system with ECObasic cylinder and immersion heater. During periods of insufficient solar radiation, the upper third of the cylinder can be heated with the help of an electrical immersion heater. The integrated thermostat can be adjusted to the required temperature. The SUNGO control controls the speed of solar circuit pump in dependence of solar radiation and cylinder temperature. This ensures continues operation and reduced electricity consumption of the pump.

- P1 : Solar circuit pump
- P2 : Auxiliary heating pump for cylinder
- P3 : Heating pump
- V1 : 3-Way valve  
(cylinder heating)
- BWM : Thermostatic mixer valve

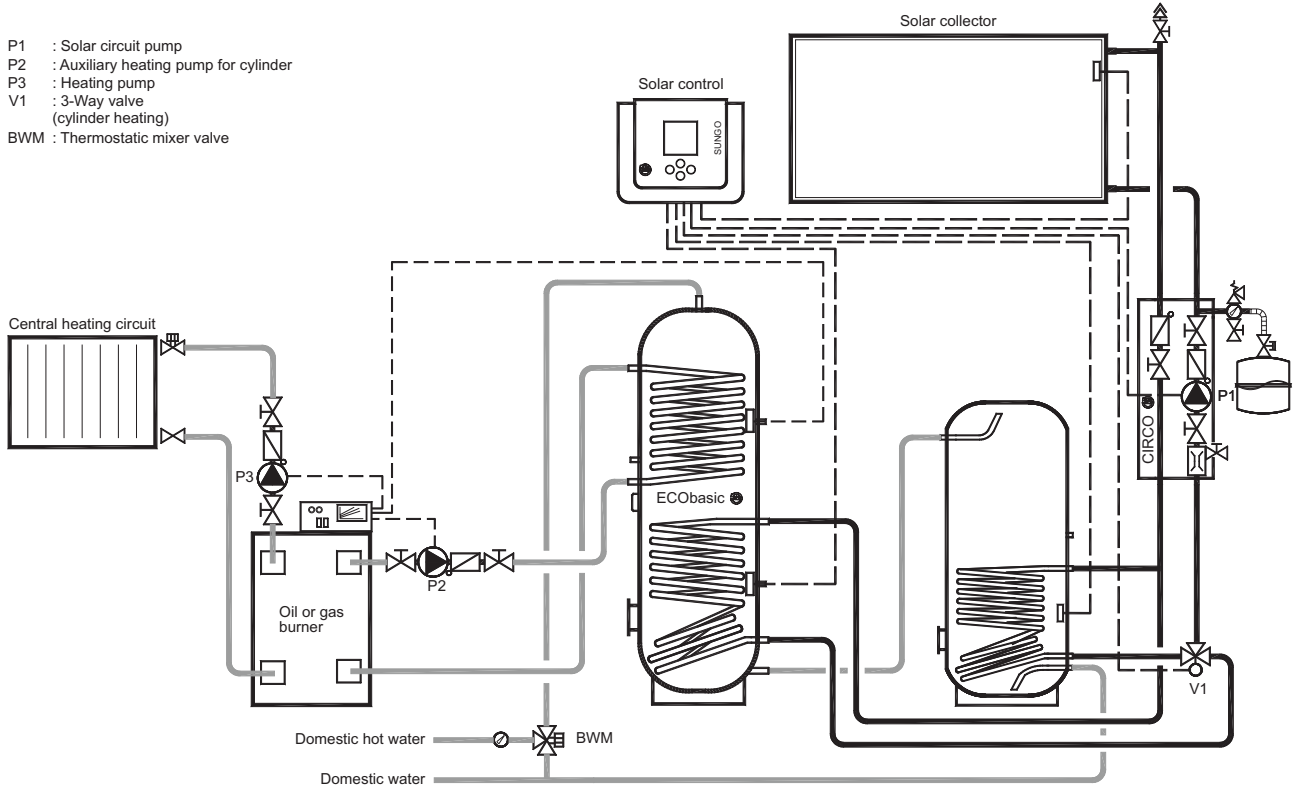


Figure 6 Solar system to heat domestic hot water. Serial connection of the ECObasic cylinder and a single-coil cylinder. The solar energy is distributed optimally by the SUNGO control. Supply is taken from the priority-heated solar cylinder. Auxiliary heating of the solar cylinder is done by oil, gas, etc.. The single-coil cylinder serves as a pre-heating storage. This type circuitry can be used in connection with an existing cylinder.

## 2. General Safety Instructions

The following safety advice is deemed to protect against dangers that can arise from improper handling of devices, whether knowingly or unknowingly.

We distinguish between general advice which we refer to on this page and special advice which can be found in the texts of the instructions. Watch for the symbols!



### **Danger** to the person

Live-threatening electrical shocks, burns, bruising and other health hazards are possible during installation.



### **Danger** to property

This symbol indicates that damage may be done to components of the solar circuit or the function of the same may be impaired seriously. Please make sure that you follow the installation procedure step by step as instructed.



### **Indicator** for additional information

This symbol points to practical advice, tricks of the trade which will make the installation and operation of the solar circuit easier.

### **2.1 Qualification of the Installer**

Setting up, installation and commissioning of the ECObasic Solar Storage Vessel must be carried out by a qualified installer.

Please note that in case of a fault report the guarantee benefits can only be claimed if the correct commissioning has been certified by a qualified person in the commissioning protocol.

### **2.2 Use and Application**

#### *Function*

The solar storage tank ECObasic is a suitable cylinder for the bivalent heating of domestic hot water. Water can be heated through the integrated solar heat exchanger. The auxiliary heating of the upper third of the vessel can be accomplished by an external heating device via secondary coil or the use of an electrical immersion heater (optional appliance).

#### *Limitations of Operation*

Please note that the ECObasic storage vessel must not be placed outside and must be operated within the limitations specified in table 1.

The location in which the vessel is placed must never reach freezing temperature and connecting pipe work must be kept as short as possible. The vessel is only suitable for keeping drinking water and must be secured against pressures above 10 bar by installing a safety valve.

#### *System Environment*

Please ensure that

- you comply with local regulations about the connection of the solar cylinder to the local water supply,
- you comply with rules and regulations about electrical connections,
- you comply with installation requirements of the producers of auxiliary heating equipment (oil burners, etc.),
- you comply with rules about lightning protection as laid-out in EN 60335-1.

We recommend integration of the solar systems and the auxiliary heating as shown in system solutions figure 3 to 6 (Chapter 1: Technical Information).

### **2.3 Norms and Guidelines**

Please comply with all regulations about the integration of the solar storage tank in drinking water and heating circuits and the regulations about the electrical connections of controls. If you install auxiliary heating, please insure compliance with the installation requirements of the producers of the equipment.

- Declaration of compliance with EC rules: The ECObasic solar cylinder has been designed and produced following current EC regulations. The cylinder complies with all conditions of DIN 4753-1. Corrosion protection according to DIN 4753-3 / 4753-6 is achieved through enamelling and the use of anodes.
- Water supply to the vessel must be done following local regulations
- The safety valve must be checked regularly to be free of obstructions and in functioning condition.
- If required, water filters must be installed in the supply to the vessel.
- The solar storage vessel ECObasic, if installed according to instructions, does fulfil the requirements of EN 806-1 and prEN 1717:1999.
- Electrical connections must be made according to local rules and regulations.

### **2.4 Local Regulations**

- Please note that it is mandatory to observe local and country regulations and legislation, which may divert from current European standards.

### 3. Installation

#### 3.1 Preparations

The cylinder must be placed in a frost-safe location and must be connected with short pipe lengths to the taps. Please ensure that the placement area is dry and has sufficient carrying capacity.

##### Required materials

In order to complete the installation of the ECObasic solar vessel the following materials are required:

- Pipe connections to fit 1" and ¾" male cylinder connections (see table 1)
- Thermostatic mixer (available as optional part)
- Safety valve unit for the cold-water feed (available as optional part).

##### Required tools

Tools to make pipe connections, stilton, cross recess screw-driver

#### 3.2 Setting up Cylinder

Please observe the following when setting up the cylinder:

- Start with the removal of the transport protection (4) and (5)
- Remove lid (2), thermometer (8), 1 ½" plug (6) and the flange cover (7) and put in a safe place.
- Remove pallet fixing and carry cylinder to its final position. There are circular indents near the top and bottom of the insulation which can serve as grips.
- Caution! Weight is 120 kg (264 pounds)! Knocks and banging can cause damage to the enamel coating on the inside!
- Turn cylinder until connections face the wall to which the pipes will be fixed allowing space for handling.

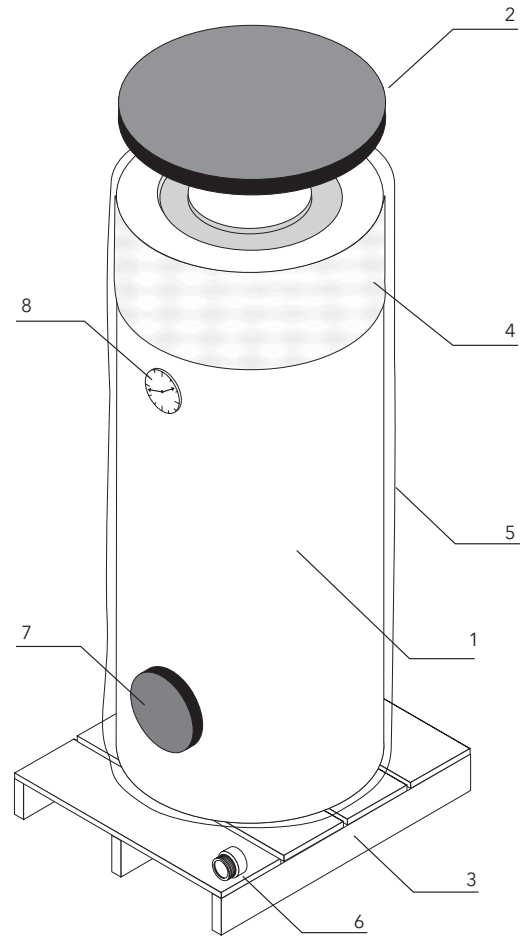


Figure 7 Removal of transport packaging

Table 3 Parts supplied with ECObasic Solar Vessel (see figure 7)	Quantity
Wooden pallet (3) 700 X 700 mm	1
ECObasic steel vessel with foam insulation (1), fixed with 3 bolts to pallet	1
PVC-Cover with zip (wrapped around vessel)	1
Thermometer (8), supplied loose	1
Polystyrene cover (7) for flange, mounted	1
Polystyrene cover (2) for top of vessel, mounted, black	1
Plug (6), male 1 ½" galvanised steel, to close immersion heater inlet, fixed to pallet	1
Transportation cover, bubble wrap (4) and plastic cover (5)	1 each

#### 3.3 Fitting of Domestic Water Unit

##### Hot and cold domestic water

Cold and hot water connections must be done according to the rules and regulations of your local water supplier. We recommend the connection as shown in figure 8.

- Connect the safety unit (2) to the cold water supply.
- The hot water line should be shaped to create a siphon in order to prevent convection movement inside the pipe work (rise: at least 200 mm). If water pressure is high enough a one-way valve can be used instead.
- Ensure that there is no valve between cylinder and safety valve. The safety valve must be laid out to release pressure above maximum operating pressure. If supply pressure is likely to be above 10 bar, suitable regulators must be installed between supply and vessel. During heating up process water may drip from the safety valve which should be guided to a drain. Alternatively, a pressure vessel, suitable for drinking water can be installed.



- It is absolutely necessary to fit a thermostatic mixer, as temperatures during the summer months can reach up to 95 °C on the hot water outlet (5). There is serious danger of scalding! The thermostatic mixer can be connected to a T-connection (3) between safety unit and cold-water inlet of the vessel (4). If no thermostatic mixer is fitted, maximum vessel temperature must be limited to 65 °C at the solar control.
- Close the immersion heater inlet (8) with the 1½" plug (7) using hemp and compound. Alternatively you may fit an 1½" electrical immersion heater. Please read details in the chapter about Auxiliary Heating.
- Retighten bolts around flange cover (9) to ensure leakage-free operation and close off again with cover.

#### Circulation

- If circulation is required (21) then the return should be taken from close to the tapping point (22). The circulation pump (23) should govern circulation according to water temperature at a measuring point (24) at the furthest away tap and with a timer.

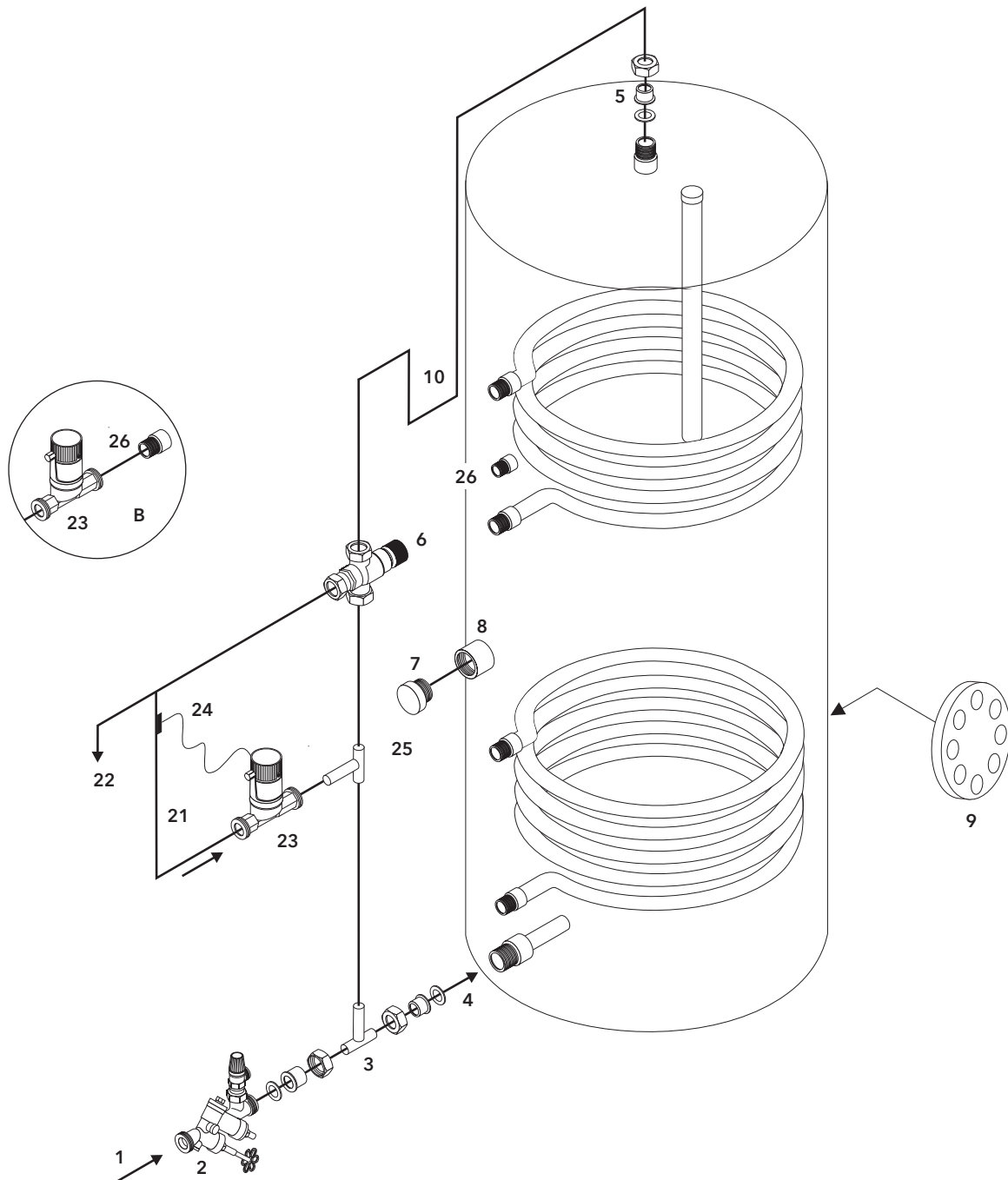


Figure 8 Drinking water connections at the ECObasic cylinder. (1) supply, (2) safety unit including connectors, (3) T-junction, (4) supply inlet including connectors, (5) hot water outlet including connectors, (6) thermostatic mixer, (7) plug, (8) 1½" inlet for electrical immersion heater, (9) access flange, (10) anti-siphoning of hot water pipe, (21) circulation line, (22) hot water tap, (23) circulation pump, (24) temperature sensor, (25) T-junction, (26) circulation connection of vessel.

- We recommend that the circulation, if required, is carried out as shown in figure 8 and should be returned to the T-junction (25) in the cold feed to the thermostatic mixer valve. If, however, the circulation is done by a non-regulated pump, then the return should be taken to the circulation inlet (26) of the vessel.
- Please note that circulation can cause significant loss of heat.

#### Pressure test of drinking water circuit

Please carry out a pressure test after all drinking water pipes and fittings are connected. Close taps after filling vessel with water and check all connections and joints.

### 3.4 Connecting Solar Circuit

- Connect flow pipe of solar circuit to the top of the solar (lower) coil (4) and the return pipe to the bottom of same (5).
- Push 1" nut (3) over copper pipe, then solder on flange fitting or fix screw thread fitting (2), then put washer into place (1) and tighten connection.



Warning: On sunny days it is quite possible that temperatures of up to 95 °C or higher can be reached in the solar circuit during installation. There is serious danger of scalding!

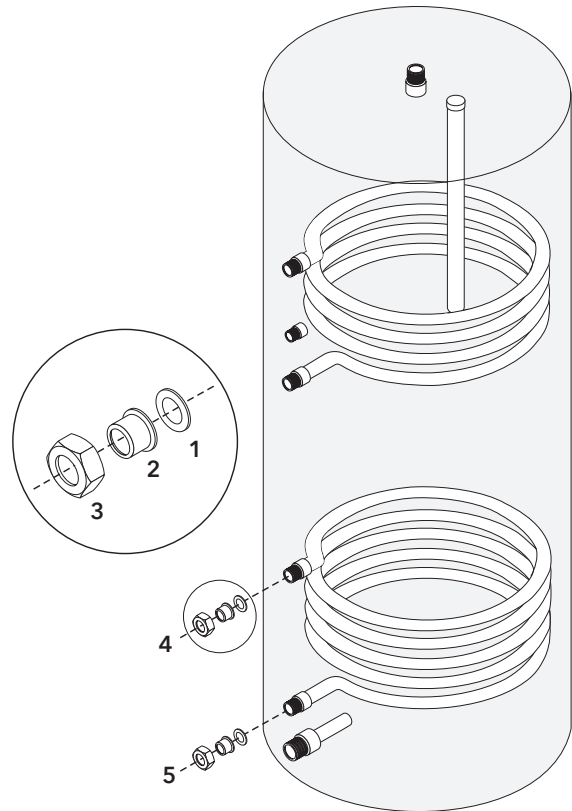


Figure 9 Connecting Solar Circuit

### 3.5 Auxiliary Heating

The auxiliary heating of drinking water can be done in various ways. Figure 10 shows the connection options:

- If auxiliary heating with the help of an oil, gas, etc. burner is required then this device should be connected to the auxiliary heating coil in the top of the vessel (5). Against common practise we recommend the following circuitry: Connect the return pipe of the heating device (1) with the fitting (2,3,4) to the top of the auxiliary heating coil. Connect the flow pipe (7) in the same way to the bottom of the auxiliary heating coil (8). Please observe the instructions of the supplier of your heating device.
- As an option an auxiliary electric heater (9) is available that can be installed in the 1½" socket on the side. Please observe instructions supplied with the heating device.

If no immersion heater is fitted, the inlet must be closed with the supplied 1½" plug (11).

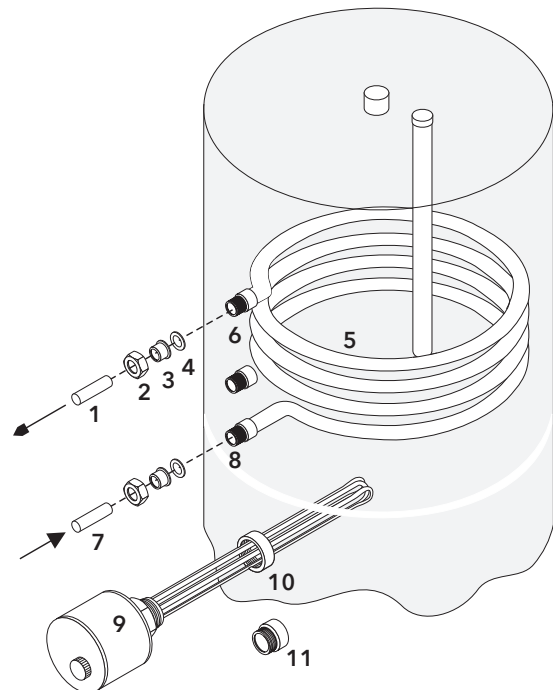


Figure 10 Connections for auxiliary heating devices. (1) flow pipe, (2, 3, 4) fittings, (6) auxiliary heating coil, top connection, (7) return pipe, (8) auxiliary heating coil, bottom connection, (9) immersion heater, (10) 1½" inlet, (11) plug

### 3.6 Installing Temperature Sensors

- Please install the temperature sensor of the solar control (1) as illustrated in figure 11 by inserting it into sensor tube (2) at the bottom half of the vessel. If auxiliary heating is done by an oil, gas, etc. burner then insert the sensor of the burner-control device (3) into the sensor tube (4) at the top half of the vessel.
- Connect the sensor cable (1) of the bottom cylinder sensor to the solar control. Connect the cable (3) of the upper cylinder sensor to the auxiliary heating. Please observe the instructions of the supplier.
- Temperature checking can be done for the top half of the vessel by reading the thermometer (5).

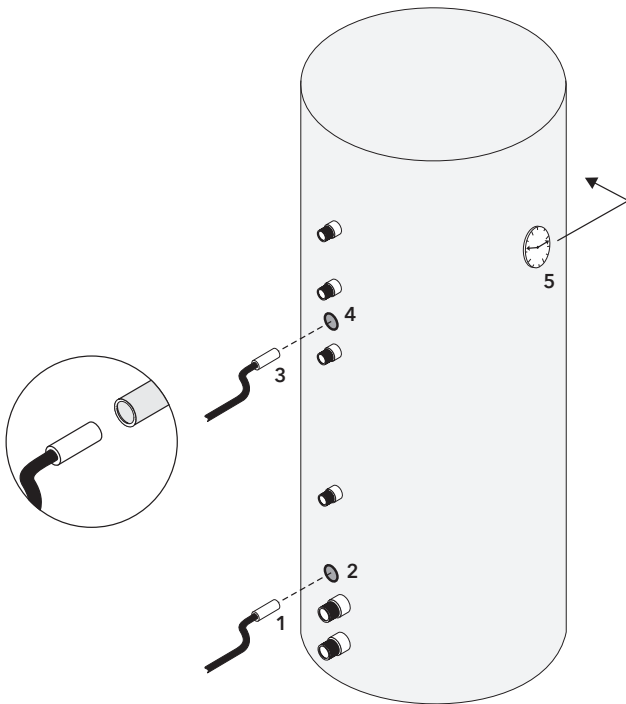


Figure 11 Connections of the temperature sensors: (1) solar control sensor, (2) sensor tube, lower half, (3) auxiliary heating sensor, (4) sensor tube, upper half, (5) thermometer.

## 4. Commissioning

Setting up, installation and commissioning must be carried out by a qualified installer.

### 4.1 Checking System

After fitting all components please carry out the following checks:

- Are all components fitted correctly?
- Are all safety units installed? Is the 10 bar safety valve fitted? If necessary, is a pressure regulator fitted and can it be closed off from the vessel?
- Are all fittings and connections safe and tight?
- If present - were all electrical connections made to required standards?
- Are the temperature sensors in the right position? Do the controls show sensible values?

### 4.2 Rinsing of the System

In spite of careful production methods, some residues of the processes, including slack remain inside the pipes, the vessel and the heat exchangers. These can cause problems during operation of the system and may lead to damage. Therefore, the system must be rinsed before permanent operation commences. Also filtering devices should be installed at convenient points in the system, as even later some production residues may become dislodged and may need to be removed.

### 4.3 Setting the Solar and Auxiliary Heating Controller

The temperature limitation of 95 °C for the solar storage vessel must never be exceeded. Please ensure that the settings are correct.

### 4.4 Filling, Air Release and Pressure Check

To avoid water damage, please make sure that before filling and commissioning the system all openings are closed, connected or fitted with the proper fittings and mountings (e.g. openings for emptying, venting, circulation, aux. heating).

Carry out a pressure test after the system has been completely installed. Be aware that the test pressure must not exceed 10 bar. In order to release air from the cylinder, open one hot-water tap until water appears and reaches a steady flow. While checking pressure is applied, do check all fittings and connections for leaks. If necessary retighten. Heat the contents of the storage vessel, for example by switching on the boiler and keep checking the pressure. Before reaching maximum allowed level, the safety valve must come into operation to release pressure.

### 4.5 Final Check Protocol

The correct commissioning of the system must be certified by a qualified person in the Final Check Protocol in order to obtain guaranty benefits in case of a reported fault.

## 5. Advice for the User

Please note that the storage vessel should be inspected and maintained at least every two years by a qualified person. We recommend a service contract.

## 6. Troubleshooting

It is quite possible that in spite of careful production methods and installation problems do occur. Some possibilities are the following:

### Leaks

Leaks can be caused by insufficient pressure on washers which are made out of best quality material but may change their density during the first few months of operation and may lead to dripping. It may be necessary to retighten those fittings after a few weeks.

## 7. Maintenance and Care

The cleaning and maintenance of the solar vessel should be carried out every two years.

- If a magnesium anode is fitted, this should be checked and replaced if necessary.
- Check for visible leakage of the vessel and fittings. Check for lime-scale or dampness at the insulation. If necessary retighten fittings.
- Release air from the vessel if necessary.
- Remember to replace the washers if fittings were opened. Flange washers may not seal properly if reused.
- Check safety valves, make sure they are not obstructed.
- Cleaning of the vessel and checking of the system should be carried out every 2 years.

Periodical maintenance must be certified in the Maintenance Protocol by a qualified person in order to obtain guaranty benefits in case of a fault report.

