



We design for your future

PRODUCT INFORMATION

SOLARBAYER-BOILER



TÜV-tested
according to
DIN EN 303-5

Technical Hand Book

Welcome among the log wood heaters

Thank you for choosing a Solarbayer product.

Your Solarbayer-gasifying log wood burner is a proven and innovative heating unit that can be purchased in different alternatives in benefits. Therefore, the log wood burner can be adjusted to the particular heating situation. The log wood burner is easy to handle and after a few days of usage you will fully be accustomed with it.

This product information is arranged in such a way that the most important elements are quick and easy to find and detect. It is necessary that you carefully read this handbook before the first usage.

We hope that you will enjoy your new boiler. Feel free to contact us if you have any questions or helpful suggestions to our products.

Now that you have purchased a log wood boiler you have to know a lot about wood itself therefore we would like to introduce you to the secrets of perfect log wood heating.

It is important to use only untreated wood for combustion, no wood with colour, no wood with transparent coating, no wood with chemical binders - just neither wood-fibre boards nor compressed fibreboards.

You have to be aware of the fact that only absolutely dry wood can be combusted in an ecologically compatible and effective way.

The moisture percentage of wood is an essential criterion. A moisture percentage of 20% is the upper limit. Wood needs time to season. Weather the split logs under a roof and pay attention to the fact that the wind can circulate through the wood piles.

The Solarbayer log wood boiler can be filled most effectively when your wood is split to a length of 50-100cm (depending on the boiler size) and an edge length of 10 cm.

Birch, beech, pine, fir and spruce wood timber need at least 2 years of seasoning under ideal conditions (consolidated under a roof).

Oak and robinia instead need at least 3 years of seasoning. Split timbers of oak trees should be stored outside during the first year of seasoning before consolidating. Oak and robinia are only to be combusted in combination with coniferous wood.

If the remaining humidity is too high the heat output is clearly diminished and leads to an increasing excess of tar which condenses at the boilers' walls and leads to the sooting of the chimney.

In case of doubt use a moisture meter.

The combustion of beech wood is long-lasting and clean. A stacked cubic metre with a moisture percentage of less than 20% replaces approximately 190 litres of fuel oil. 1 stacked cubic metre of coniferous wood, e.g. fir, can replace approx. 135 litres of fuel oil.

If you have chosen your Solarbayer log wood burner according to your energy needs and if you use it as exclusive heating system you should provide yourself with approx. 2 stacked cubic metres of wood per calculated kW. (calculated heat output of approx. 10 kW => 20 stacked cubic metres of wood).

1 Control
Simple controller for efficient burn cycle

2 Large fuel chamber door

3 Forced draught fan
A variable speed motor supplies the air needed for the gasification process in the boiler.

4 Bottom door
Easy access to bottom of the boiler for cleaning

5 Fuel chamber
For logs sizes from 50 cm up to 100 cm (depending on boiler type)

6 Primary air duct
Pre-heated air is added through the air channel at the back, to achieve clean combustion.

7 Ceramic nozzle with secondary air duct
Brings about the right air to gas mix, which creates the best possible flame

8 Combustion chamber
Made of high temperature resistant fireclay bricks, to complete gasification process which results in minimal amount of ashes

9 Ash chamber

10 Exhaust gas heat exchanger with turbulators
For best energy transfer to the heating system

11 Damper
To be used when lighting up the burner (Draft Regulation)

12 Safety Heat Exchanger
Will cool down boiler in case of overheating

13 Boiler flow-line

14 Boiler return-line

15 Chimney flap with exhaust gas sensor

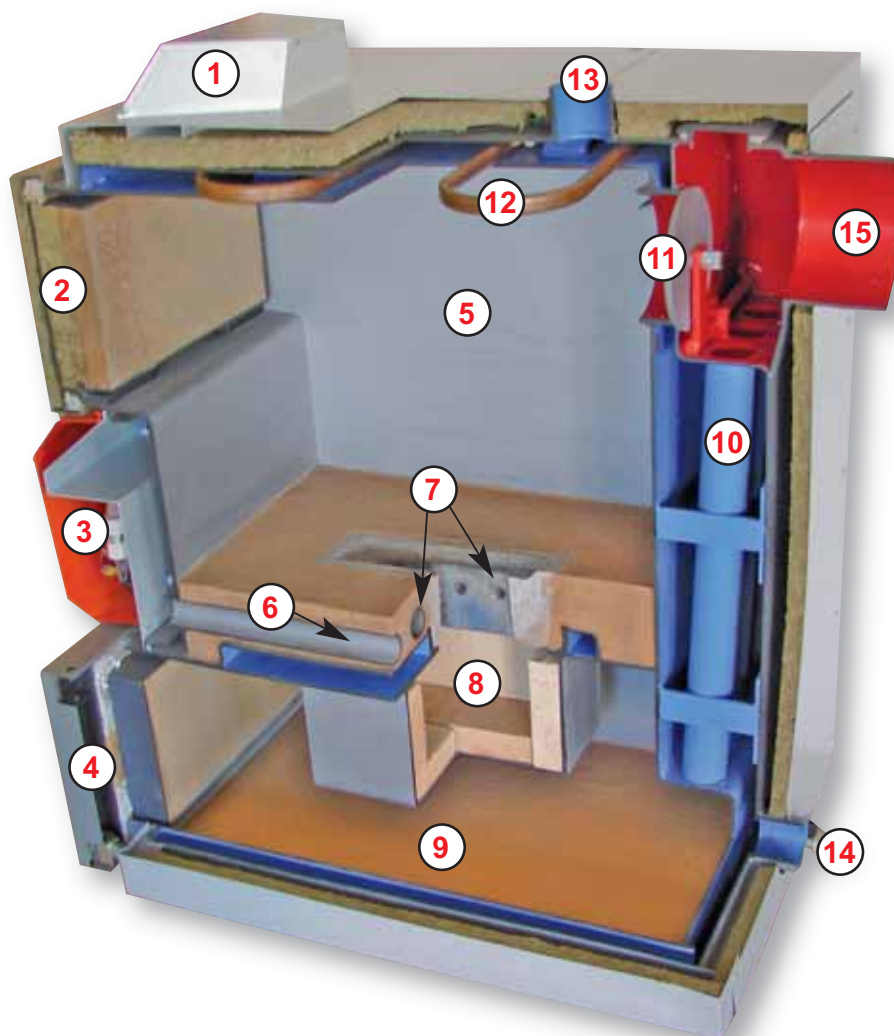
Inside the burner



Upper Fire Box



Gasification at the jet in the Lower Chamber



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1. Sizing the Boiler

Please note that the boiler output specified can only be achieved under full load. To heat up the boiler will take approx. 30 min until full load is reached. The boiler output is kept for a period of approx. 2 hours, after that the burn-out phase follows with reduced output for a period of approx. 1.5 hours. The residual embers in the combustion chamber coasts the temperature for about one more hour, after that the fuel is completely used up. Hence, the duration of the burn cycle is approx. 4 hours.

The boiler will be heated up in the morning and in the evening, thus a burning time of approx. 8 hours is achieved.

Warning: This is imperative for the rating of the boiler to avoid that the boiler output is rated too weak.

Rough estimate of boiler size by means of living space:

Example:	building with 150 m ² living space
	desired boiler size Solarbayer 25 kW
	required heat output per square metre living space*
	Old building 0.12 kilowatt per m ²
	New building 0.08 kilowatt per m ²
	Low energy house 0.05 kilowatt per m ²

Calculation of the daily output of the building

e.g. living space 150 m², e.g. new building => 0.08 kW/h per m²

$$\frac{150 \text{ m}^2 \times 0.08 \text{ kW/m}^2}{= 12 \text{ kW}}$$

The hourly output for the new building with an outdoor temperature of -16°C results in 12 kW/h

Daily requirements	$\frac{24 \text{ hrs} \times 12 \text{ kW}}{=288 \text{ kWh}}$
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The heat output required at -16°C outdoor temperature is 288 kW per day.

Calculation of the boiler output: e.g. SOLARBAYER 25:

Output	$\frac{25 \text{ kW} \times 4 \text{ hrs}}{= 100 \text{ kWh}}$	(full load)
--------	--	-------------

The burning-down heat output of a 25 kW solid fuel boiler at approx. 4 hrs full load results in 100 kW.

Daily requirements of the new building	$\frac{288 \text{ kWh}}{100 \text{ kWh}}$	(burning-down heat output)
to achieve the necessary heat output of the building	= 2,88 boiler fillings	

With this building you must fill the boiler around **3 times** per day with an outdoor temperature of -16°C. An average of 2 fillings per day should be sufficient..

This calculation is for general information only and does not replace professional design!

* If the boiler is dimensioned too small you will achieve boiler temperatures of 70 - 80°C, but the desired heating supply line temperature will not be achieved, e.g. building size 220 m² old building: boiler output 25 kW (wrong rating!) Correct would be SOLARBAYER 50kW.

2. General Information SOLARBAYER boiler

2.1 Technical Description

Thermal boilers SOLARBAYER15, 25, 40, 50, and 80 are designed for the combustion of dry wood, starting from sawdust up to logs, length corresponding to the size of the fuel chamber, max. length 14 cm. Sawdust, chippings and wood splinters need to be burnt along with wood logs.

The interior of the boiler consists of a fuel chamber where the fuel is dried and gasified. The wood gas developed is led through a fire resistant jet into the combustion chamber where it starts burning by means the addition of secondary air. Waste gases are intensively cooled down in the heat exchanger. The unburned waste products shall be swept out of the combustion chamber. For heating up the boiler is equipped with a damper which is operated by a connecting rod at the front of the boiler.

For smooth operation the boiler is provided with a logically and user-friendly structured control unit.

2.2 Construction

The boilers are made of 4 and 6 mm thick steel panels which are welded together. The inner steel parts which are in direct contact with the waste gases are 6 mm thick. The heat exchanger consists of welded steel tubes, diameter 57 x 5 mm. The heat exchangers are single-row (boiler types SOLARBAYER 15, 25, 40) or two-row (boiler types SOLARBAYER 50, 80) depending on boiler size.

Standard SOLARBAYER® boilers are provided with a safety heat exchanger to prevent overheating. The thermal safety valve has to be connected to it (cf. chapter 4.1). The safety heat exchanger is made of a copper tube, diameter 18 mm and permanently installed.

The boilers welded at robot production places are welded together by using MAG-technology.

The boiler covers are made of powder-coated steel sheet. The lower combustion chamber is lined with standard fireclay bricks P4 (40 mm thick). The floor of the fuel chamber is filled with fireproof mortar. The replaceable heat-resistant jet is made of fireproof material. Boilers of 15 – 40 kW are equipped with a combustion air ventilator; from 50 kW onwards two ventilators are provided. A glass fibre door seal with a square cross section (25 mm) is used. As insulation of the heat exchanger cover glass fibre with round cross section (8 mm) is used.

Thermal insulation of the boiler consists of insulation material NOBASIL (20 and 40 mm thick). Waste gases are removed through an exhaust air duct of steel, diameter 160 mm (SOLARBAYER 15, 25) and diameter 200 mm (SOLARBAYER 40, 50, 80).

**Hydraulic connection diagrams
are displayed in our schematics handbook on
www.solarbayer.de**

2.3 Technical Details

effective boiler output in kW			14,9	25	40	50	80
nominal boiler output with performance control		kW	3 bis 21	5 bis 31	8 bis 42	15 bis 72	25 bis 92
efficiency factor			85 – 91 %				
height	A	mm	1120	1120	1370	1420	1420
height supply line	B	mm	1045	1045	1310	1400	1400
height return line	C	mm	115	115	125	215	215
height drain valve	D	mm	60	60	70	135	135
height exhaust pipe (center)	E	mm	890	890	1110	1170	1170
width incl. gate valve	F	mm	645	645	645	785	785
width	G	mm	590	590	590	760	760
depth	H	mm	1070	1070	1070	1260	1650
depth supply line	I	mm	240	240	240	520	520
flue outlet Ø	J	mm	160	160	200	200	200
distance to boiler edge	K	mm	305	305	305	880	1210
distance	L	mm	402	402	402	70	70
recommended chimney diameter Ø		mm	140	150	180	180	200
required chimney draft		Pa	15-20	15-20	15-21	15-23	15-23
effective min. height chimney		m	8	8	8	9	9
max. operating pressure		bar	3	3	3	3	3
noise level		dB	45,5	45,5	47,7	51,4	54,2
waste gas mass flow at 13% CO ₂		kg/s	0,019	0,023	0,029	0,035	0,035
waste gas temperature		°C	190-260	190-260	190-260	190-260	190-260
boiler connection		inch	2 "	2 "	2 "	2 "	2 "
boiler water volume		Liter	75	75	93	180	205
combustion chamber volume		Liter	120	120	185	315	483
chamber door access (w / h)		mm	435 / 255	435 / 255	435 / 255	575 / 318	575 / 318
max. log length		mm	550	550	550	750	1100
fuel volume beech wood approx. 20% res. moisture		kg	47	47	72	122	186
energy content beech wood		kWh	170	170	260	450	680
burning time beech wood		h	6,3	5,1	5,4	6,3	6,9
heating of water from 45°C to 90°C (ΔT 45 K)		Liter	3270	3270	5030	8520	12990
fuel volume fir wood approx. 20% res. moisture		kg	33	33	52	88	135
energy content fir wood		kWh	120	120	190	320	490
burning time fir wood		h	4,8	4,5	4,6	4,8	5,1
heating water from 45°C to 90°C (ΔT 45 K)		Liter	2290	2290	3630	6150	9440
weight of boiler		kg	430	430	480	780	950
recommended min. buffer storage volume		Liter	1000	1500	2200	3000	4400

Technical changes and errors are reserved

Calculation of Buffer Volume:

Recommended

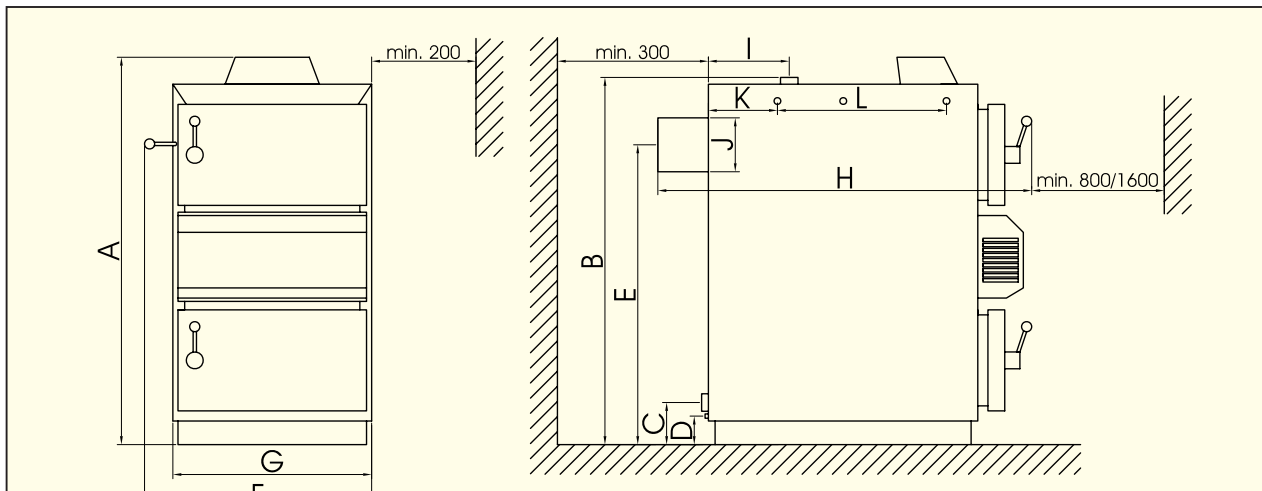
Per kW nominal boiler output at least 55 litres of buffer water are needed.

A maximum of 100 litres per kW nominal boiler output must not be exceeded.

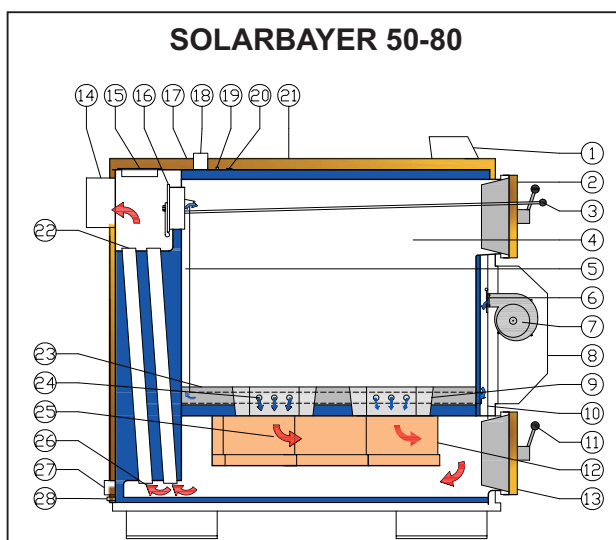
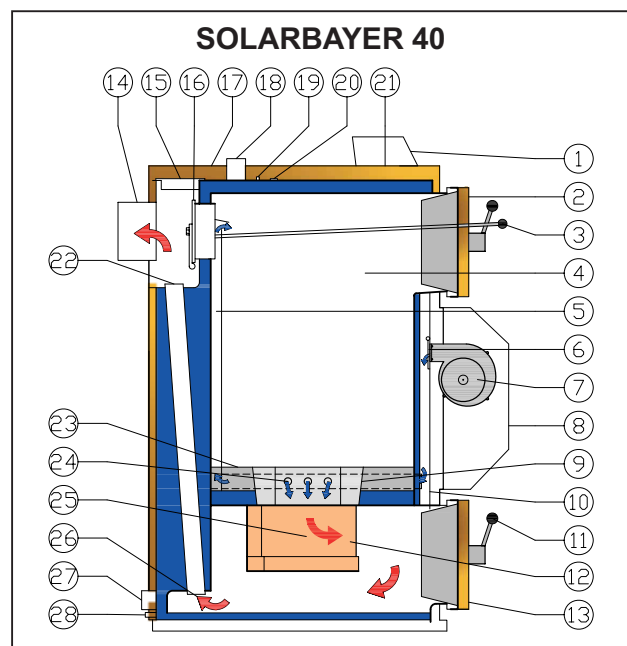
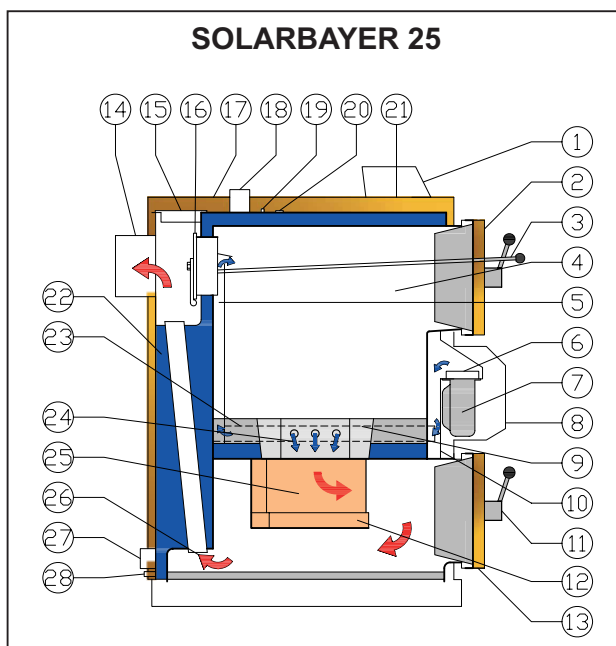
Buffer storage tanks must be installed with each wood-fired boiler system.

2.4 Dimensions

Dimensions of the SOLARBAYER-Log Burner



2.5 Boiler Diagram



- | | |
|-----------------------|------------------------------------|
| 1 Control | 15 Heat exchanger cover |
| 2 Upper door | 16 Damper control lid |
| 3 Damper Control Rod | 17 Upper cover (rear) |
| 4 Fuel Chamber | 18 Flow |
| 5 Primary air duct | 19 Thermal safety valve assembly |
| 6 Fan flap | 20 Thermometer |
| 7 Fan | 21 Upper cover (front) |
| 8 Fan cover | 22 Heat exchanger pipes |
| 9 Ceramic nozzle | 23 Fireproof cladding |
| 10 Secondary air duct | 24 Secondary air duct |
| 11 Door handle | 25 Combustion chamber |
| 12 Refractory bricks | 26 Direction of exhaust gas stream |
| 13 Bottom door | 27 Return water |
| 14 Chimney flap | 28 Drain |

3 Safety Regulations

3.1 Mounting and Setup

- The boiler can be only operated within a central heating system with a heat capacity corresponding to the output of the boiler.
- The assembly has to be performed according to the currently asserted DIN norms and regulations
- When using forced circulation the central heating must be designed in such a way that the minimum heat consumption of 5 kW of the boiler output is guaranteed in case of power failure (breakdown of shunt valve with pump - Laddomat). The pipelines to the buffer storage tank should be installed with automatic transition into gravitation flow.
- The boiler must be connected to the chimney in a workmanlike manner and by the shortest way.
- Do not install any further heating systems to the chimney.
- Only use thermal safety valves that are tested and registered according to DIN 3440.
- The boiler must be placed on a firm, load-bearing floor.
- The minimum temperature of the return line water at the boiler inlet must be 72°C.
- The room where the boiler is installed must be ventilated by means of a permanent opening with a diameter of at least 250 cm. Openings for air supply and air exhaust shall be around the same size.
- The boiler must be erected in a normal room

3.2 Safety Measures - Fire protection

The boiler shall be installed in accordance with the applicable fire protection regulations. With regard to installation specified safe distances from combustible and inflammable materials and objects have to be observed. For thermal boilers with an output up to 50 kW the specified safe distance from combustible materials of class B, C1 and C2 must be at least 200 mm and of class C3 at least 400 mm in accordance with standard. The safe distance is reduced to half if a non-combustible thermal insulation board (asbestos board with a minimum thickness of 5 mm) is installed 25 mm from protected combustible material. The board shall project at least 150 mm above the outline of the boiler with smoke exhaust and above the upper surface of the consumer must be at least 300 mm free space.

Material classification:

Class A: non-combustible building materials (asbestos, concrete, mortar, brick, glass, fireclay, etc.)

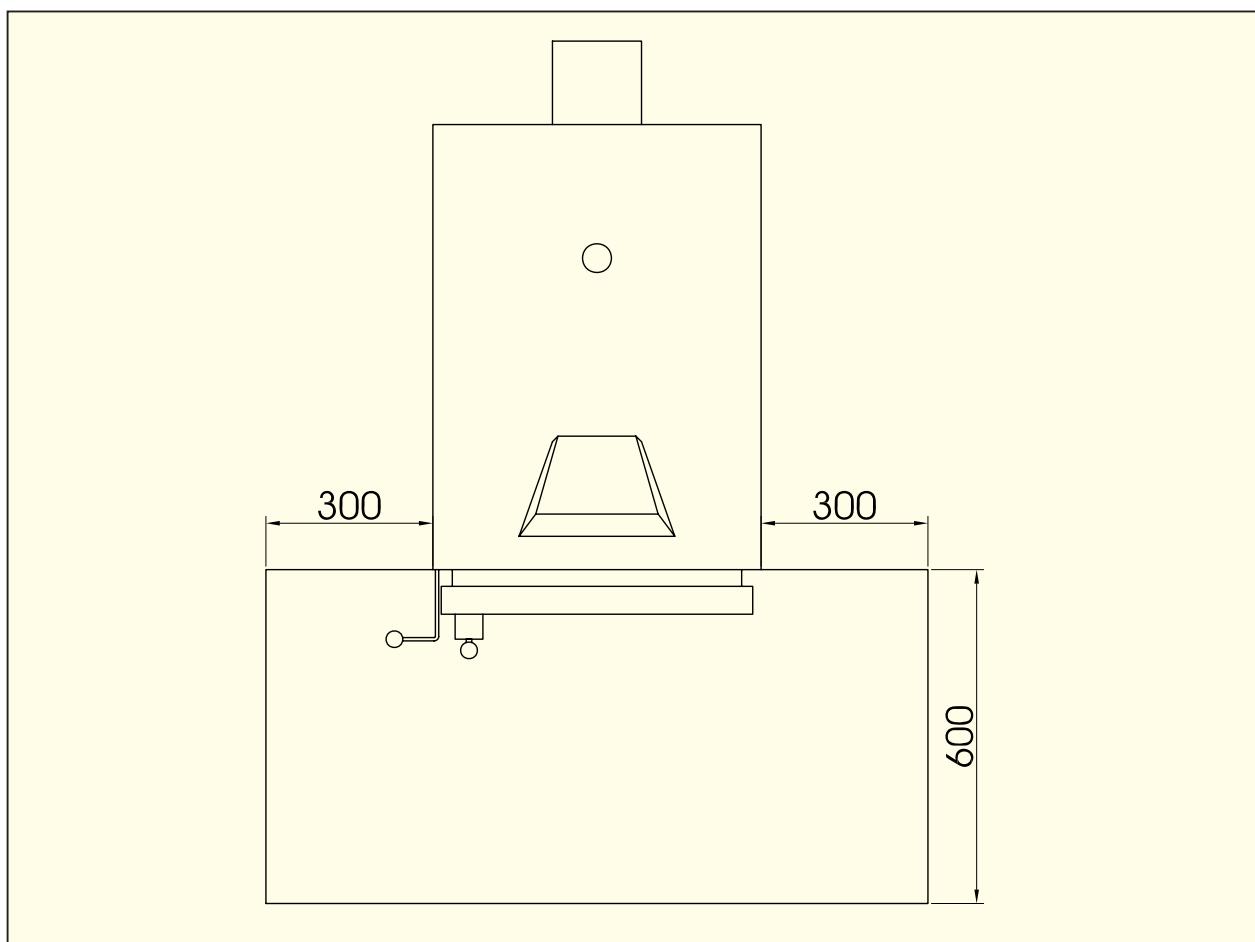
Class B: very hardly combustible materials (gypsum cardboard, etc.)

Class C1: hardly combustible materials (lignite boards, chip boards in acc. with STN 492615, etc.)

Class C2: moderately combustible materials (wood – oak, alder, larch, fir, wood chip boards, etc)

Class C3: easily combustible materials (wood – pine, beech, ash, poplar, wood fibre boards, cork, foil sheets, polystyrene, polyethylene, bituminous cardboard, pulp, plywood, etc)

In case of any doubt the SOLARBAYER boiler has to be placed on a protective plate (see figure page 11). If there are any ambiguities please contact the appropriate regulating authority (i.e. district chimney sweeper).



3.3 Safety Regulations for Operation and Maintenance

The staff operating the boiler must observe the rules and regulations and standards in connection with operation:

1. During operation of the boiler, electrical equipment and cables of the boiler must not be intervened with, for example:
 - removal of covers of electrical systems such as boiler electronics, ventilator, thermostat
 - exchange fuses
 - repair of damaged cable insulations, etc..
2. Maintenance or repair work that requires removal of covers of electrical parts of the boiler must only be performed by the person entitles in accordance with publication No. 74/1996 of the compendium of laws.
3. Prior to removal of the covers of the boiler or an electrical device connected to the boiler it is necessary to switch off any mains supply.
4. If defects at the electrical installation or defects at the installation of the boiler are detected it is necessary to observe the following rules:
 - do not touch boiler parts
 - immediately disconnect the boiler from power supply; call the responsible service engineer to solve the problem
5. Heat-resistant cable placing according to VDE standard.

4 Additional equipment for SOLARBAYER boilers

4.1 Safety heat exchanger

A thermal safety valve is laid down by DIN 4751-2 for solid fuel heating system.

Use of the safety heat exchange:

In case of power failure the thermal safety valve (thermostatic valve Watts STN 20) serves as boiler protection mean to prevent overheating.

Assembly of the safety heat exchanger:

The boilers are already equipped with the safety heat exchangers. The thermal safety valve (thermostatic valve Watts STN 20) will be delivered separately.

Mounting of the Safety Valve STN 20:

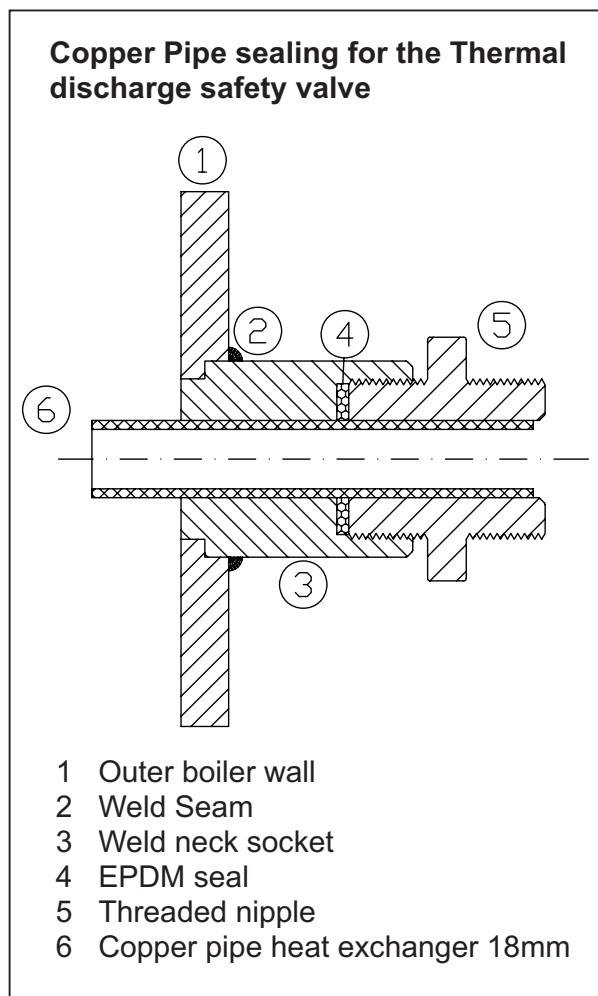
It is important, to fit the thermal safety valve in such a way, that, under operating conditions, the safety heat exchanger is depressurised and is not connected to the pressurised part of the heating system. The thermal safety valve has to be connected to the pressurised mains water line, without any means of shutting of the water supply (Stopcocks, valves, etc.). The drain side has to be run unobstructed into a gully or drain.

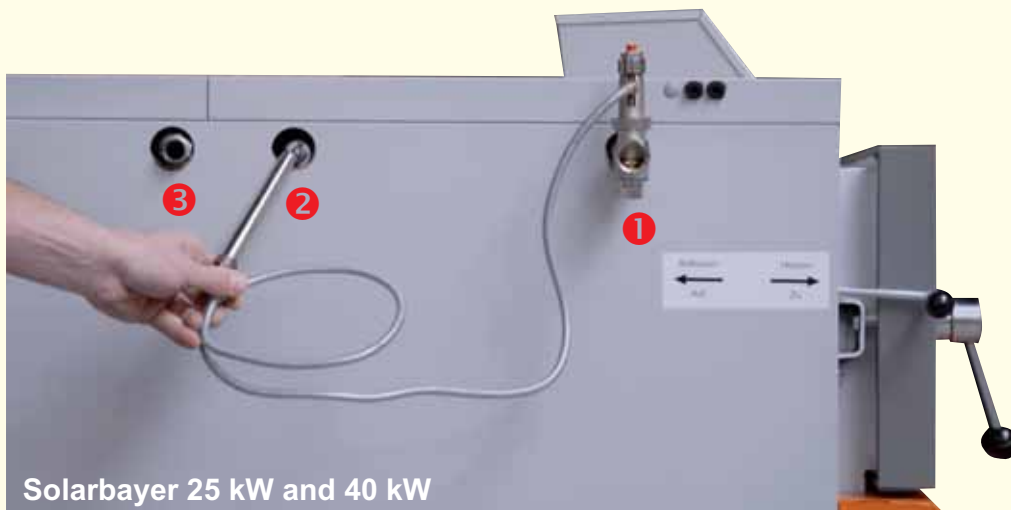
Note: The thermal safety valve has to be fitted before the system is filled or put into operation. Observe local guide lines.

Function of the Safety Vale :

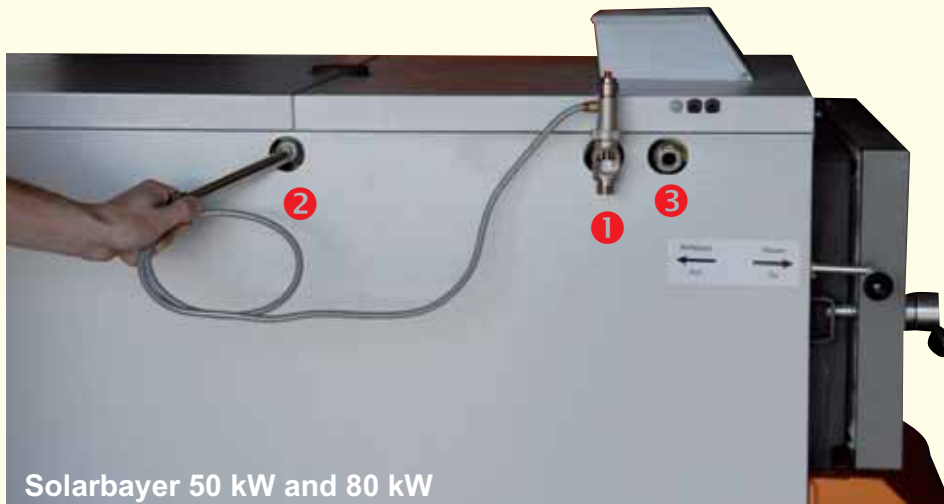
The pressure independent valve opens when the flow temperature of aprox. 95 °C is reached. By opening the valve, it will cause a constant drain of water which inhibits the temperature to rise above 110 °C.

NOTE: The galvanised nipple of the safety heat exchanger is attached with a washer seal to the copper pipes by screwing, if a water leak shall occur between the different fittings, tighten the galvanised nipple or replace the washer seal.





Solarbayer 25 kW and 40 kW



Solarbayer 50 kW and 80 kW

- ❶ thermal discharge safety valve (discharge valve Watts STN 20 ¾"), cold water input
- ❷ sensor pocket with dual temperature monitor
- ❸ cold water output

Please test the thermal safety valve at first use for operation by heating up the boiler to opening temperature.

Thermal discharge safety valve



Note:

According to DIN 4751-2 pt 10 you are asked to have an inspection carried out by a suitable qualified person at least once a year.

4.2 Boiler Circuit Pump, Laddomat

Note: To run the boiler efficiently and to guarantee a long service life, it is important to operate the burner with a boiler return control that ensures a return temperature of 72 °C to the burner. We recommend the Laddomat 21.

Electrical Connection:

Connect the boiler circuit pump to the connection rail on the control panel (see chapter 12.2 for layout).

Maximum load 200 W.

Function of the boiler circuit pump:

Once the SOLARBAYER-log burner is switched on, the pump is activated to ensure a constant rising of the boiler temperature.

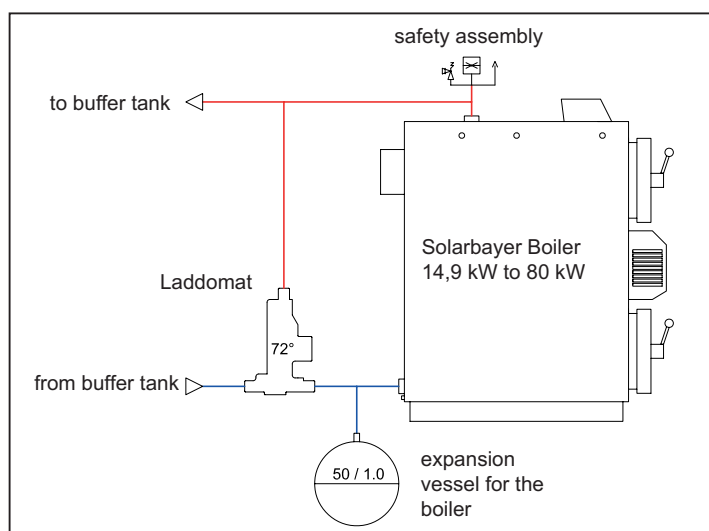
When the boiler is switched off, the pump stops. In the event that the boiler temperature exceeds the set temperature (90 °C) the pump switches on to prevent overheating.

The operation status of the pump is shown by the LED diode on the display.

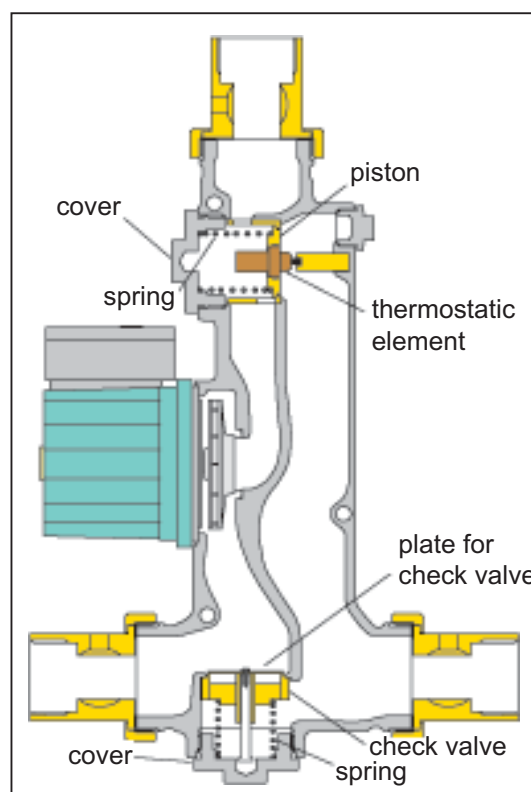
In case of a malfunction or fault of the temperature sensor, the pump switches on!

Warning: Running the boiler without a thermal return control will result in the building up of condensation, which will lead to rapid corrosion of the boiler walls.

For a clean and efficient combustion a boiler temperature between 75 and 90 °C is necessary. This can only be achieved with the Laddomat.



Laddomat 21 with temperature set at 72 °C



4.3 Induced draught fan (optional)

The standard SOLARBAYER boiler is equipped with a forced draught fan. The electronic control enables the additional application of an induced draught fan (ID fan).

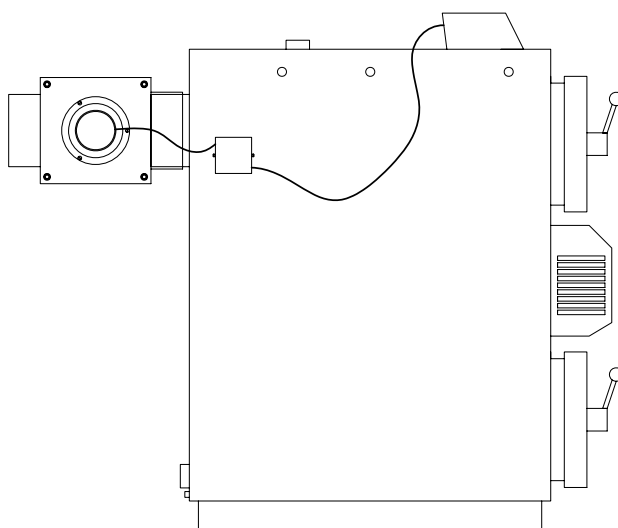
The ID fan provides for the optimum removal of flue gases out of the fuel chamber during loading of fuel. Thus, no flue gas escapes out of the fuel chamber during loading.



The ID fan is not included in the standard equipment of the boiler. It is available in sizes 160 mm and 200 mm as optional accessory.

The ID fan for direct attachment to the flue pipe is suitable for all boilers.

Correctly Installed
ID fan
(motor **horizontal**)



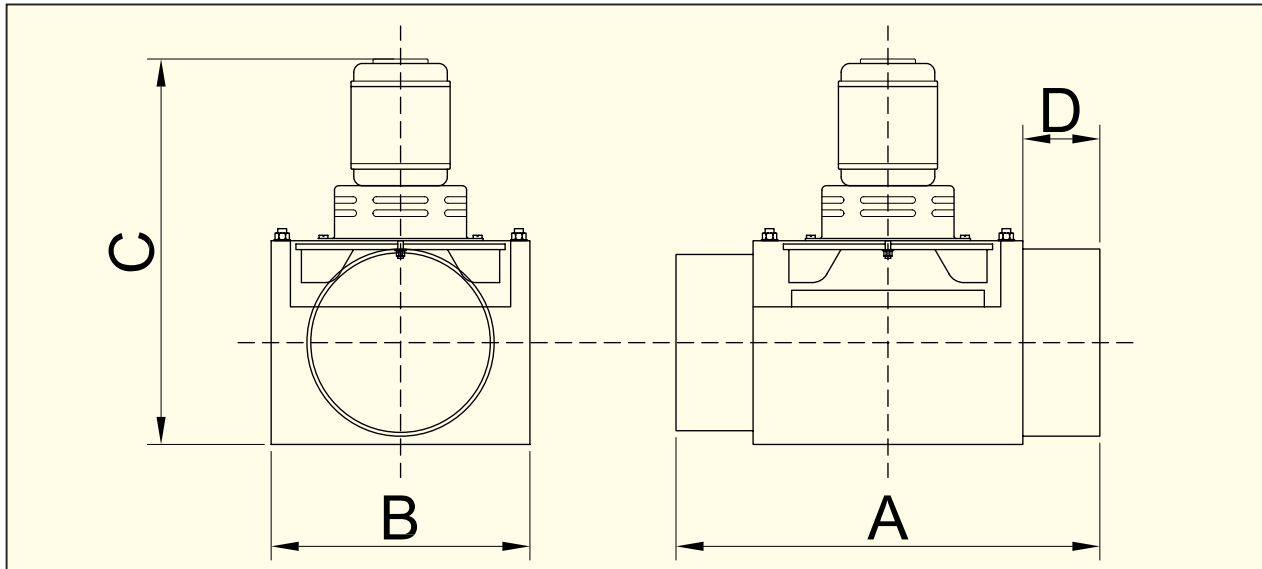
Warning:
Do not install motor vertically!

Degasing the fuel chamber with the induced draught fan

Exhaust Fan 90s
boiler temp — °C



After pressing key “+” at the control unit, the Id fan is put into operation for 90 seconds. After pressing the key again further 90 s are added, maximum running time of theventilator is 300 s. Fuel can be refilled during the operation of the ID fan.



Technical Data:

The motherboard of the control unit holds a joint for the connection of the exhaust fan (see chapter 13.2 for wiring diagram)

Technical Data Induced Draught Fan

Max. Temperature (°C)	600
Motor Speed (1/min)	2780
Output (Watt)	48
Mains Supply (V/Hz)	230/50
Protection	IP 20
Weight (kg)	13
Max. Temp. Motor (°C)	80
Overall length A	385 mm
Width	235 mm
Height with Motor C	247/280 mm
Exhaust Inlet/Outlet D	70 mm
Outlet/ Inlet Diameter	160/200 mm

If the exhaust gas formation is too high while refuelling the boiler and therefore leads to unpleasant odours, we recommend the installation of an induced draught fan. The retrofitting is easy to handle. An electrical connection is pre-installed.

Note for correct sizing of expansion vessel:

Dimensioning of the expansion vessel (10% of heating water volume)

e.g. 2000 litre heating water = 200 litre expansion vessel.

Warning: The expansion vessels are factory-preset to 1.5 bar diaphragm pressure. It is necessary that the vessels are adjusted to the height of your installation. Measure the installation height of your house, from the basement to the topmost radiator.

Example: installation height 7 metres + 2 metres extra = 9 metres.

9 metres correspond to 0.9 bar diaphragm pressure at the expansion vessel.

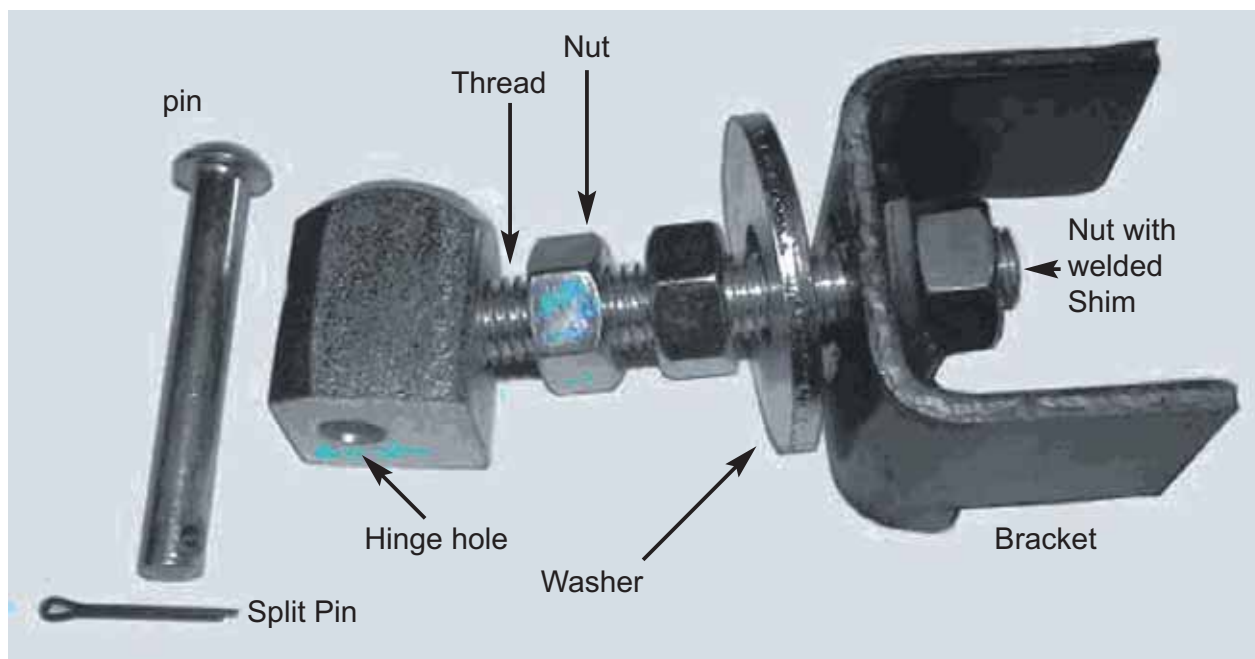
The vessels need to be checked every 2 years by relieving the heating pressure and measuring of the diaphragm pressure. Afterwards the cold heating installation must be filled to 1.2 bar. During heating up the heating pressure will increase a little and drop again during cooling down.

5. Main Parts of the SOLARBAYER Boiler

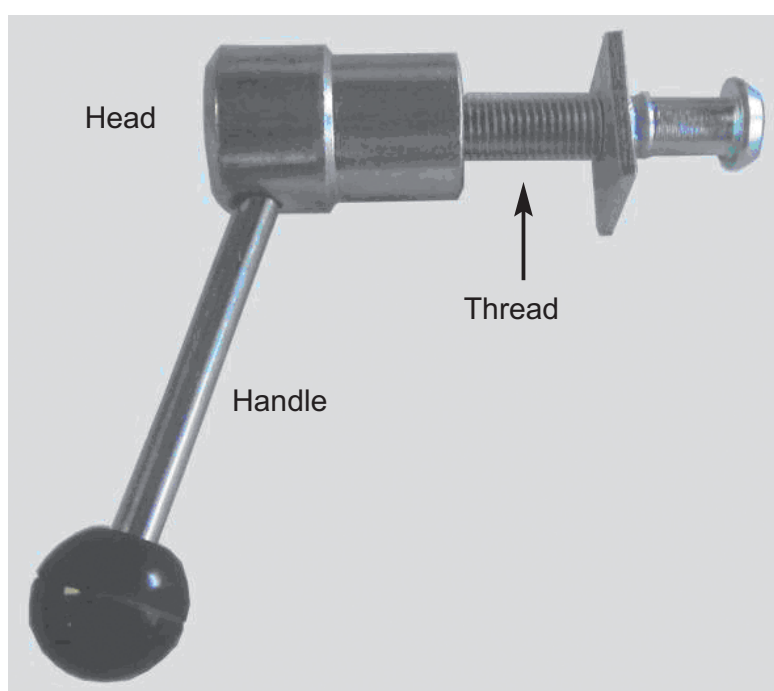
5.1 Adjusting the doors

The boiler doors are fastened at three points: at two turning pins and the closure. If the doors are not tight enough they can be adjusted at the hinged side. If the nuts are loosened, the hinge screw can be turned and the door pushed into the direction wanted. afterwards, retighten the nuts again.

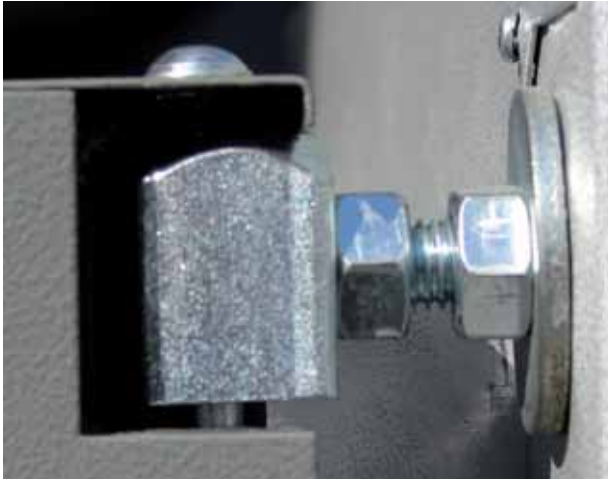
Parts of the Door Hinge



Parts of the Closing Handle



The threads of hinge and handle must be greased on occasion.



Adjustable hinge at the right side of the boiler

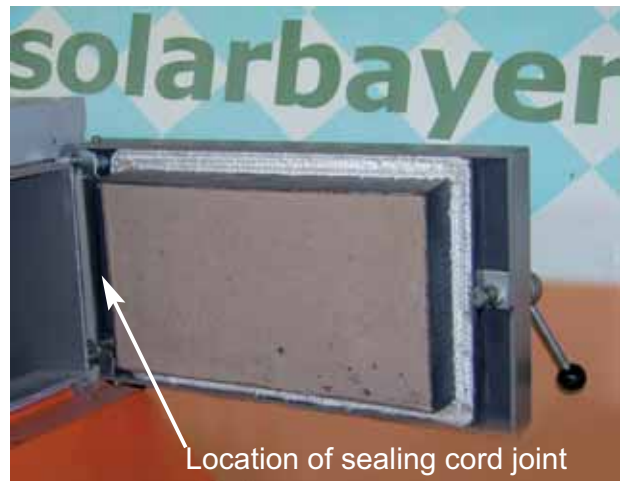


Fastening plate welded on to the boiler body

5.2 Door Seal on the Fuel Chamber

Replacement of thermal insulation

1. Open door completely
2. Find the joint of the insulation at hinged side of the door using a screw driver.
3. Remove the hardened insulation gradually using a screw driver
4. Match the ends of the old or new sealing cord and press them in the groove between the hinged joints starting in the middle. Distribute the remainder of the insulation evenly to the sides and press it together in the middle.
5. If there are leakages put some heat-resistant silicone into the groove at the corners.
6. Always start in the middle in direction of the corners when inserting the door insulation. Take care, that the insulation is not turned round and that the corners are filled well.



The doors, like the boiler, consist of the insulations and a sheet-metal covering

Attention: As the inside of the door is made of heat resistant concrete care must be taken that the upper door is not used to press the fuel into the boiler because this leads to damage of the lining.

Damaged lining should be removed and replaced. Adequate mortar is available at SOLARBAYER. Prepare the mortar mixture not before starting the repair work. If prepared use immediately. The setting time of 24 hours has to be respected.

5.3 Cover plates of boiler body

The cover plates of the boiler body are made of powder-coated steel sheet and treated with fired colour to protect the plates from corrosion. Three colours are used: grey, silver and SOLAR-BAYER-orange. Grey is used for the cover plates of the upper and lower doors, the ventilator casing is varnished with SOLARBAYER-orange and silver is used for the remaining jacket of the boiler.

The upper front plate needs to be dismantled for the entry of the thermostatic sensor. To dismantle this plate, the two self-cutting screws at the front must be loosened first. Then you remove the cover caps located at the corners of the upper front plate with a slot-head screw driver. Below the cover caps are self-cutting screws which shall only be loosened. At first, you push the upper front plate 2 cm to the front and then you tilt it carefully from the front to the back.



Note:

Prior to removal of the boiler jacket or one of the electrical devices connected to the boiler, all cables must be disconnected from the mains supply.

The side cover plates shall be dismantled as follows: At first, the upper front plate must be removed as described above. Then the upper plate at the back needs to be dismantled. The upper and lower boiler door must be tightly locked. To dismantle the cover plate on the hinged side the nuts pressing on the galvanized shims shall be loosened. When dismantling the plate on the closure side the two screws located under the closure of the door shall be removed. Then the ventilator casing shall be removed. At the back side all self-cutting screws shall be removed and then the two side cover plates can be dismantled.

The door cover plates shall be dismantled as follows: at first, the entire doors shall be dismantled in such a way that the pin can be pulled out of the hinge. The closure of the door shall be dismantled. The doors shall be laid down in such a way that the interior side lies on the floor. The cover plate of the long sides shall be pulled out and laid down. The cover plate is only put on to the doors.

5.4 Installation of turbulators




The turbulators which are delivered along with the gasifying wood log boiler can be installed in the exhaust gas heat exchanger ducts (see picture) when needed.

Recommendation: The turbulators should be installed when heating with dry, untreated wood with little resin .

When heating with either very resinous wood and/or residual wood the turbulators **should not** be installed.

To clean the exhaust gas ducts the turbulators have to be removed, afterwards they can be installed again.

	
Number of turbulators required:	
HVS 14,9 to 40	6 turbulators
HVS 50 and 80	16 turbulators

5.5 Forced draught fan

SOLARBAYER boilers are constructed as overpressure boilers, i.e. the air volume required for combustion is supplied by forced draught fans. Boilers, type 15 – 40, are equipped with one forced draught fan, in boiler types 50, 80 two fans are installed. The fan consists of 4 basic parts:

1. Fan casing made of aluminium alloy
2. Motor
3. Capacitor
4. Fan wheel



Note: A dust free and clean environment is the basic condition for the reliable operation of the ventilator. Therefore, it is necessary that the fan is regularly checked and serviced. If the noise level becomes more intensive, dust from the blades of the propeller should be removed. Dust on the blades results in noisy operation and leads to decline in the technical parameters and thus to lower boiler output and worse emission values.

Prior to replacement or dismantling of the fan all power cables must be disconnected from power supply. Then the cover plate shall be dismantled. With boiler types SOLARBAYER 40, 50, 80, 100, access to the screws is easy and it is possible to remove the plate below the ventilator in order to reach the screws.

The fans installed in boilers SOLARBAYER 15 and 25 are provided with an intake guard plate to reduce the air volume required for combustion. This guard plate can be only found in ventilators with metal sheet propellers. The guard plate is not necessary for plastic propellers

5.6 Sheet metal base for forced draught fan, ventilator damper, adjustment of secondary air

The sheet metal base for the ventilator is a plate onto which the forced draught fan is mounted. A part of this plate is provided with screws for the regulation of the secondary air volume and the ventilator damper. The plate is fastened to the boiler body with self-cutting screws which are located all around the plate.

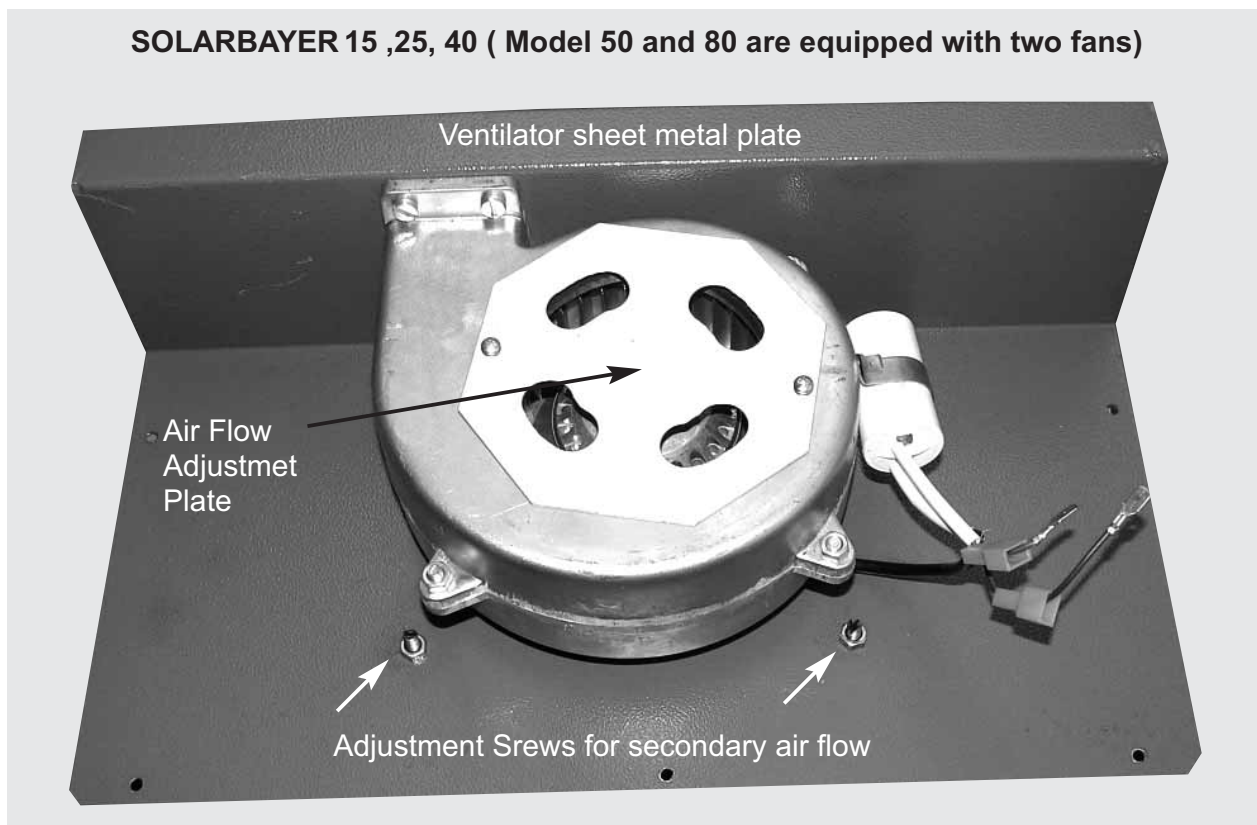
Behind the ventilator is a safety damper which protects the forced draught fan from back pressure and prevents self-ignition of the fuel in case of high chimney draught.

Note: In case of insufficient air pressure in the fuel chamber the function of the ventilator damper needs to be checked.

In order to guarantee optimum combustion in the boiler correct, adjustment of the secondary air is very important. The procedure is as follows: at first, the fastening nuts at the screws must be loosened and then the screws need to be turned clockwise by means of a slot-head screw driver all the way to the stop. Afterwards, the screws shall be turned anticlockwise in 2 – 3 turns.

Adjustment of the secondary air shall be carried out every time the sheet metal plate is placed below the ventilator or when the insulation beneath the plate is replaced. Small air draught can lead to incomplete combustion, high air draught to a so-called “cracking/popping inside the boiler”.

The adjustment of the secondary flow has to be carried out before first commission and, if necessary, adjusted according to the particular chimney draught conditions.



The fans used in the SOLARBAYER-boiler 15 and 25, are fitted with an intake protection plate which is used to regulate the air flow, to adjust the power output.

5.7 Fireclay Bricks in the Combustion and Ash Chamber

Combustion chamber bricks: The refractory bricks are only loosely adjusted in the combustion chamber, as you can see beneath

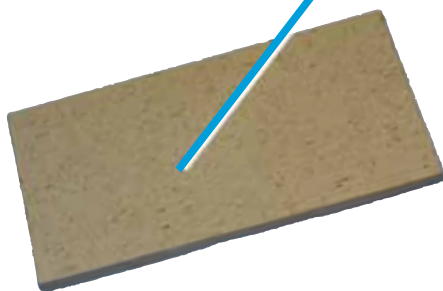
Attention: the refractory bricks have to overlap the edge of the combustion chamber.

If the refractory bricks are adjusted incorrectly, the fire hits the edge of the combustion chamber unopposed and might damage the steel tank prematurely.

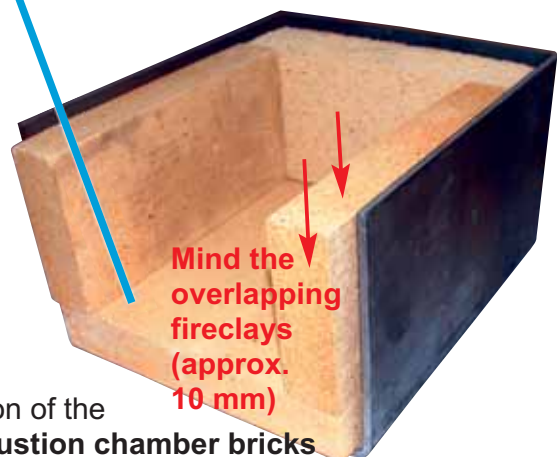
A deformation or a melting loss of the steel tub does not affect the performance of the boiler and therefore it is not a defect.

Ash chamber bricks: To protect the boiler's ash chamber against high heat influence and possible damages, the Solarbayer boiler are equipped with 2 fireclay bricks (boiler type 40, 50 and 80) which have to be placed underneath the combustion chamber.

While cleaning the ash chamber, the fireclay bricks have to be removed and afterwards positioned correctly again.



The **ash chamber bricks** as well as the combustion chamber bricks are wearing parts and have to be exchanged when needed. Suitable bricks are available at SOLARBAYER.

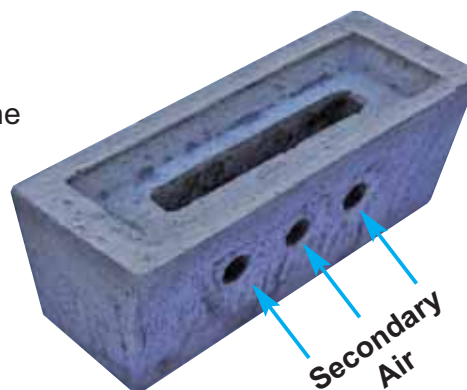


Position of the **combustion chamber bricks** in the steel tub (example: HVS 25)

5.8 Nozzle and Lining made of Refractory Concrete

The nozzle is a formed part of fire-resistant concrete and provides for the mixing of flue gases with secondary air which results in absolute combustion. The nozzle is located on a grate cooled with water. The seat of the nozzle is lined with refractory mortar up to the height of the nozzle edge. The service life of the nozzle is dependent on mechanical damage during putting on fuel and raking of fuel. For this reason, the nozzle is considered as consumable part and can be replaced. The nozzle should be replaced only in case of a complete breakdown. Cracks in the nozzle are no reason for its replacement.

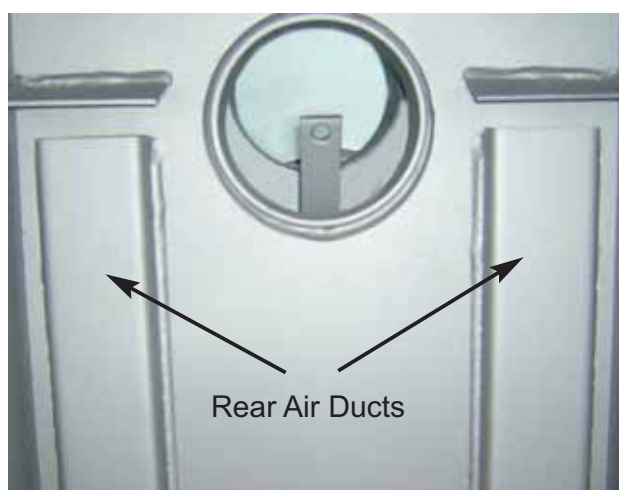
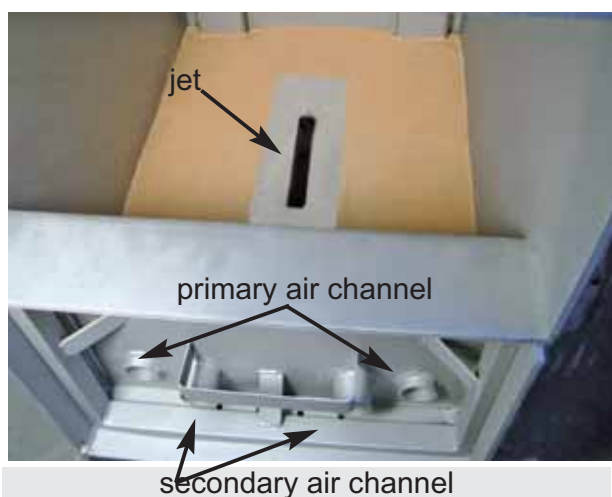
The pyramid shape makes replacement relatively easy. If the nozzle is damaged, the remaining parts of the old one need to be removed. Afterwards, a new nozzle shall be installed into the opening. Please, check if the new nozzle fits well into the designed opening. If it does not fit exactly, the opening shall be adapted and not the nozzle. After installation of the nozzle the permeability of the individual holes shall be checked.



5.9 Primary and Secondary Air Ducts

By primary air ducts the supply of the necessary air volume from the ventilator into the combustion chamber is guaranteed. It is provided as the so-called rear air duct. The advantage is better heating of primary air.

When the plate below the ventilator is removed the primary and secondary air lines are accessible. The ducts at the edge lead the primary air, the inner ducts lead the secondary air into the nozzle. Primary air volume is not regulated but dependant on the ventilator type.



5.10 Safety Temperature Limiter STB

A safety temperature limiter is connected to the control board.

In case of overheating, boiler temperature higher than 95°C, the forced draught fan is switched off from the connection (230V/50Hz).

Interference signal  ● flashes.

ERROR
MAX. TEMP.

Pressing the key  displays

Pump  LED flashes (is operating)

After cooling down to less than 90°C the STB can be unlocked again by pressing 

Another possibility is to unlock the STB manually at the display casing. Release the black cover and press the green safety button. The boiler is ready for operation again.

Possible reasons for overheating are:

- a broken boiler circuit pump
- a closed valve
- air in the system
- maximum boiler temperature is achieved

The problems have to be solved immediately.



STB-safety temperature limiter



Possibilities to unlock the STB

5.11 Boiler Control Unit

SOLARBAYER boilers are always provided with Abgastronic

The control unit's basic principle consists in temperature regulation of the heating water being released by the boiler and of the exhaust gas temperature. The desired temperature is reached by air volume control which is carried out by continuous control of the fan capacity.

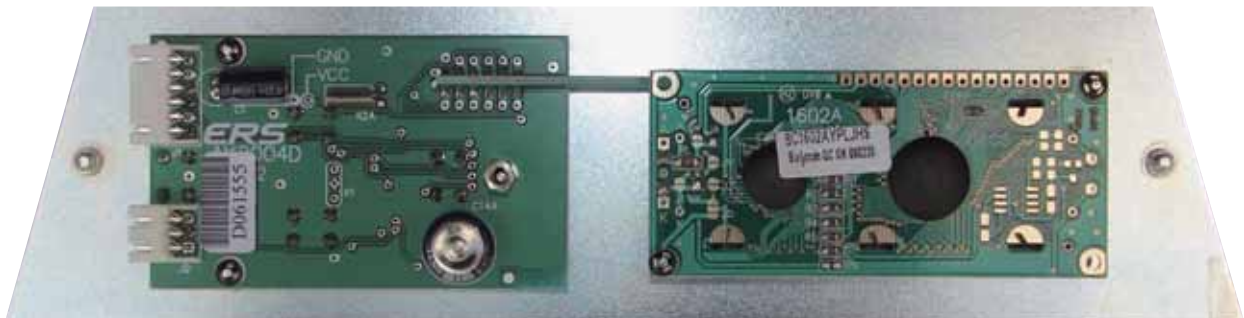
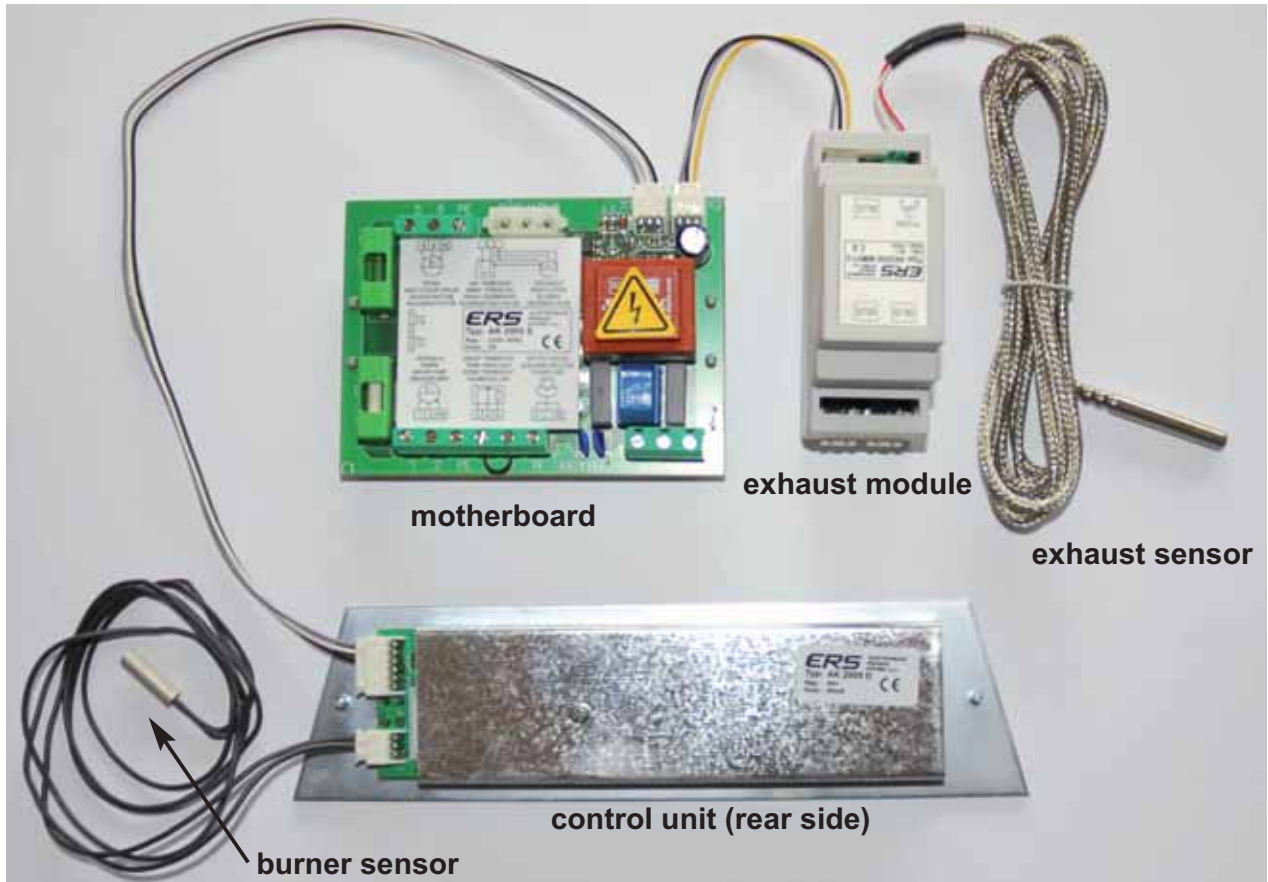
The control unit consists of three electronic modules:

- the control unit with LC display, LED display and 4 keys
- the motherboard, named AK 2005 S, controls the electronic parts such as the forced draught fan, circulating pump, etc.
- SOLARBAYER Abgastronic module AK 2000 MMKT

The control unit is solidly installed in the boiler cover plate. The control board and the exhaust module are installed onto a 35mm DIN rail. Mains voltage exists only in module AK 2005 S, the control unit with its LC display is electronically isolated from the mains voltage and supplied with safe 9 V DC power.

All electric parts of the SOLARBAYER boilers are installed at the strip terminal of the control board.

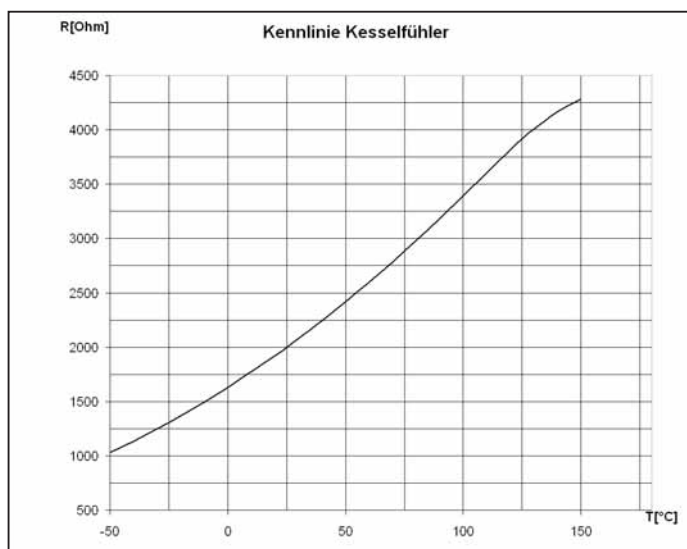
For terminal layout see chapter 12.2 (wiring diagram)



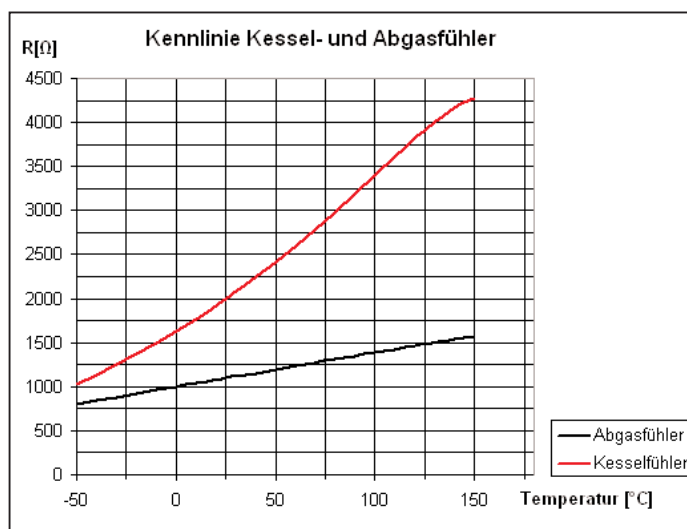
Control unit with display (rear and front view)

5.12 Sensor parameters

To monitor the temperature in the burner a KTY 2000 type sensor is used. The sensor is connected straight to the display (small plug). The performance of the sensor is shown in the graph below. (i.e. 25 °C - 2000 Ohm)

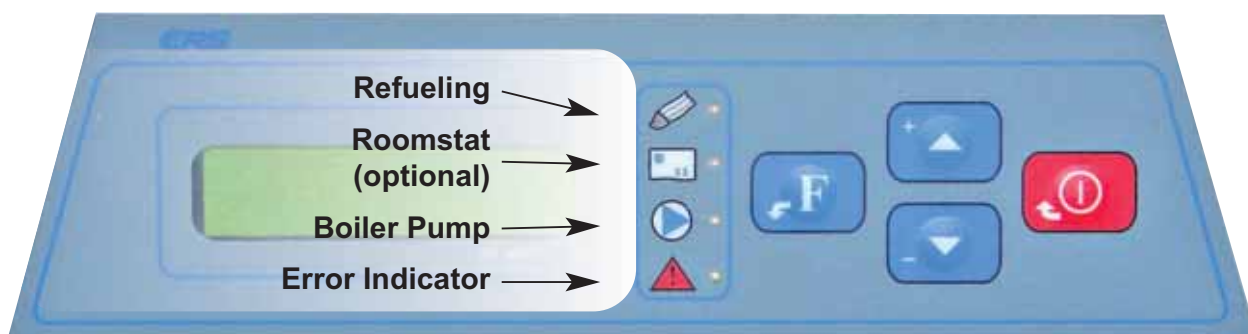


A Solarbayer-PT 1000/600 type sensor is used to detect the exhaust gas temperature, which is connected to the AK 2000 MMKT controller. The performance of the sensor is shown in the graph below. (i.e. 25 °C 1000 Ohm)



6 Control Menu

6.1 Directions for use



On the control panel are four pressure keys:



Menu key; to enter into the setup menu and submenu.
To confirm entered values.



To switch burner on or off.
To escape the submenu to the next level menu.

In the main menu and its submenus:



Parameter selection and increase or decrease the adjustable values



In the “basic menu”:




To activate the induced draught fan „Optional“;
(see chapter 8.1)





To vent the fuel chamber without the exhaust fan
(see chapter 8.1)

Factory setting is “basic menu”, after 100 secs idle it will return to “basic menu” as well.

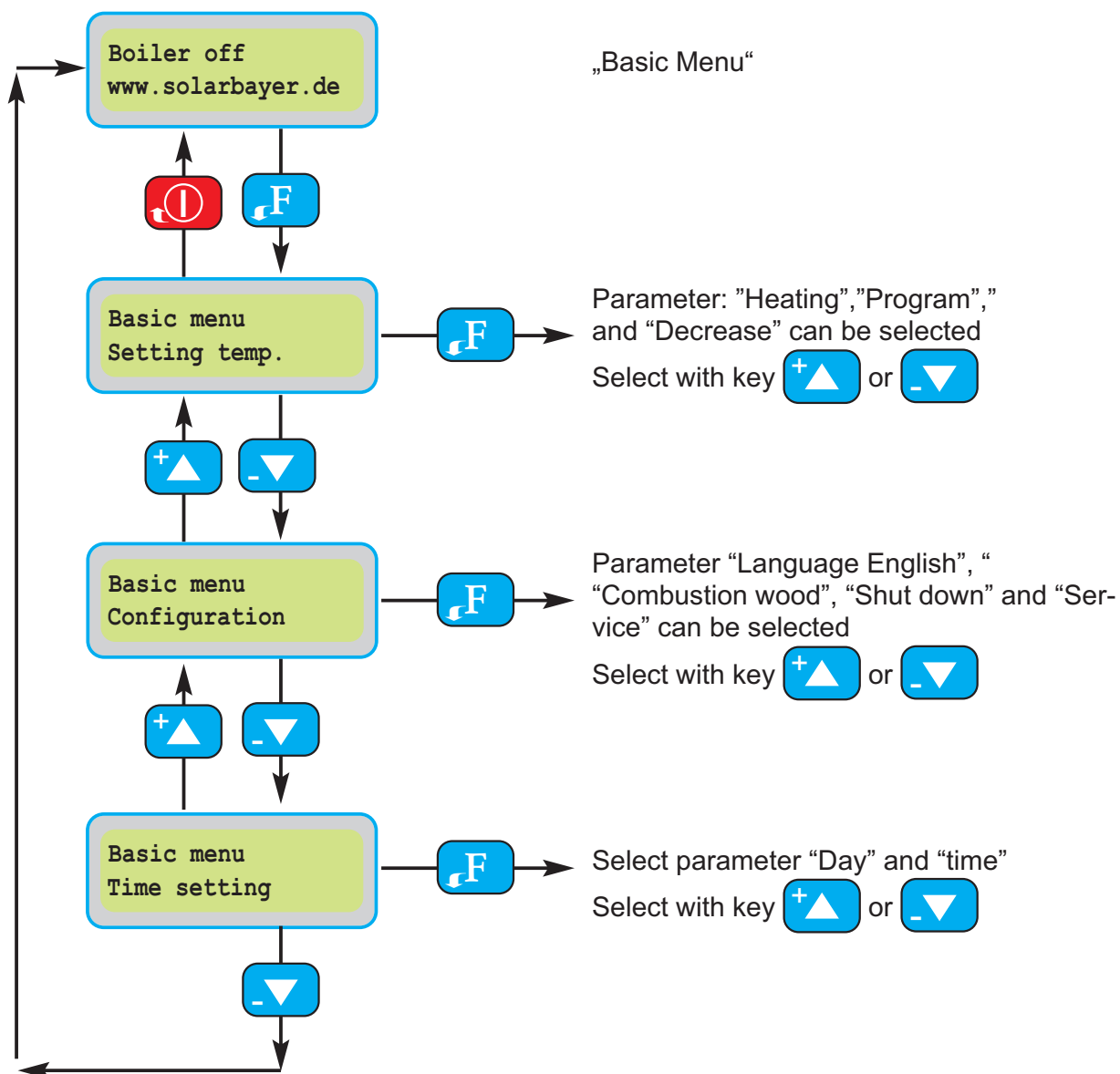
To leave the main menu and its submenus, press key  repeatedly until “basic menu” is displayed

The parameter in the menu can be called upon with key  or key 

Values which are flashing can be adjusted; with key  or key 

After altering a value confirm new value with key 

6.2 Flow Chart of the SOLARBAYER-Abgastronic control unit



6.3 Presetting and Changing of Parameters

The burner is pre-wired, only the Laddomat-Pump of the return flow increase and the ID fan motor have to be wired on site.

All settings are factory preset, the burner is ready for use.

Short overview of the SOLARBAYER factory settings:

Preset Values					
Parameter	Factory Setting	Changeable from	Up to	Solarbayer-Recommended	Your setting
Boiler Temperature	85°C	65°C	90°C	90°C	
Program	S	1	10 (=S)	S	
Reducing Value	30%	20%	40%	30%	
Switch off Temperature (Exhaust gas temperature)	50°C	35°C	150°C	80°C	
Service Settings					
Exhaust Gas Temperature	150°C	150°C	250°C	180°C	
Fan Speed	42%	3%	69%	42%	
Type of Burner	0	0	1	0	
Program	16	1	17	16	

Attention: The values highlighted in **yellow** are pre-set for systems with buffer storage tanks. Do not alter!

Service data changes are carried out under Code (see chapter 6.4)

6.3.1 Adjusting the Boiler Temperature

The boiler temperature is the temperature that shall be reached and maintained in the boiler in relation to the set exhaust gas temperature.

Basic menu
Setting temp.



Press key

boiler temp.
Heating 90°C



Press key

boiler temp.
Heating 90°C



Confirm with key, display starts flashing



Press keys to adjust temperature between 65 - 90 °C



Preset = 90 °C

We recommend 90 °C



Confirm with "F" key, display stops flashing

The boiler temperature is set.

In a cold boiler the permitted exhaust gas values cannot be maintained, therefore the boiler temperature has to be set between 80 and 90° C. Only with this setting an optimal combustion is possible.



6.3.2 Adjusting the Switch Off Temperature

The switch off temperature defines the temperature value in the exhaust gases. The boiler will be switched off if it falls below that value.

Basic menu
Setting temp.



Press button

In the main menu press keys  or  until

Basic menu
Configuration

is displayed

Configuration
Language English



Press button.

Press  or  until

Configuration
Shut down ____ °C

is displayed

Configuration
Shut down ____ °C



Confirm with button
Value starts flashing.



With the keys, up or down, select temperature
from 35 - 150 °C



Preset = 80 °C

We recommend 80 °C





Confirm with button. Value stops flashing.

Switch Off Temperature is set.

6.3.3 Setting the Time

The date and the time can be set in the „Time Setting“ menu. Once the burner is switched on for the first time and after a power failure the clock has to be set.

After mains supply, key  flashes. After pressing  the display shows error message :

ERROR
SLEEP

Date and time have to be adjusted

Basic menu
Setting temp.



Press key

In the main menu press  or  until



Basic menu
Time setting


is displayed


Time setting
_____ 10:02



Press key to confirm

Week day starts flashing; adjust with  or 

confirm with  Hour setting starts flashing. Adjust hours the same way as the day and repeat for minutes.

Confirm each setting with 

To go back in to the “ Basic Menu” press 

6.4 Adjustment of the SOLARBAYER-Abgastronic

To change the parameters exhaust gas temperature, minimum fan speed, boiler type and the program of the SOLARBAYER-Abgastronic, go to the “password mode”. To enter it, please follow the steps shown below.

Basic menu
Setting temp



In the main menu press keys or until

Basic menu
Configuration



is displayed

Configuration
Language English



press key



press both keys simultaneously, until display shows



Configuration
Password: 0

press key until code “Password 111” is displayed

Password setting
Boiler type 0



press key
now you entered the “Service Level”

with key and select parameters.

6.4.1 Adjusting the Exhaust Gas Temperature

The exhaust gas temperature defines the desired value, which has to be reached and maintained. An average exhaust gas temperature is picked up by the sensor in the flue opening. Because of the position of the sensor, the temperature can read about 20 to 50 degrees higher for short period of time. This fact is given by the changing flow of the core of the exhaust gases which does not allow measuring the core temperature correctly. (see picture).



To change the exhaust gas temperature go into the "password mode". (see previous page)

Press  or  until

Password setting
Max spaliny 180°C

is displayed (Spaliny is the exhaust gas temperature)

Password setting
Max spaliny 180°C



Press key



Use keys to adjust "Max spaliny ____°C" from 150 - 250 °C
Factory setting = 180 °C



We recommend 180 °C



Press to confirm

The exhaust gas temperature is now set.

6.4.2 Adjusting the Minimum Fan Speed

The minimum fan speed is to be changes in the "password mode".

To get into the "password mode" see chapter 6.4.

The minimum fan speed defines the power of the fan at its lowest setting. The setting can be adjusted in between 3% to 69% .

Factory setting is 42%.

In service mode press  or  until

Password setting
Min.speedfan 42%

appears on the display .

Password setting
Min.speedfan 42%



press to confirm.

original value starts to flash.



with + and - buttons set the new value

"Min.speedfan __%" between 3% - 69% .



SOLARBAYER - Setting = 42%



press F to store.

The new minimum fan speed is now set

6.4.3 Selecting the Boiler Type

Go to the “password mode” to change the boiler type. (see chapter 6.4)

The SOLARBAYER control contains two different boiler types

Type „0“ – standard boiler SOLARBAYER

Type „1“ – pellet boiler SOLARBAYER

The SOLARBAYER-Controller is preset to Type „0“.

Press key  or  in the “password mode” until

password setting
Boiler type 0

is displayed

password setting
Boiler type 0



to confirm press key
Display starts flashing



use keys to select type “0” or “1”



Solarbayer-Setting “0”



To confirm press key

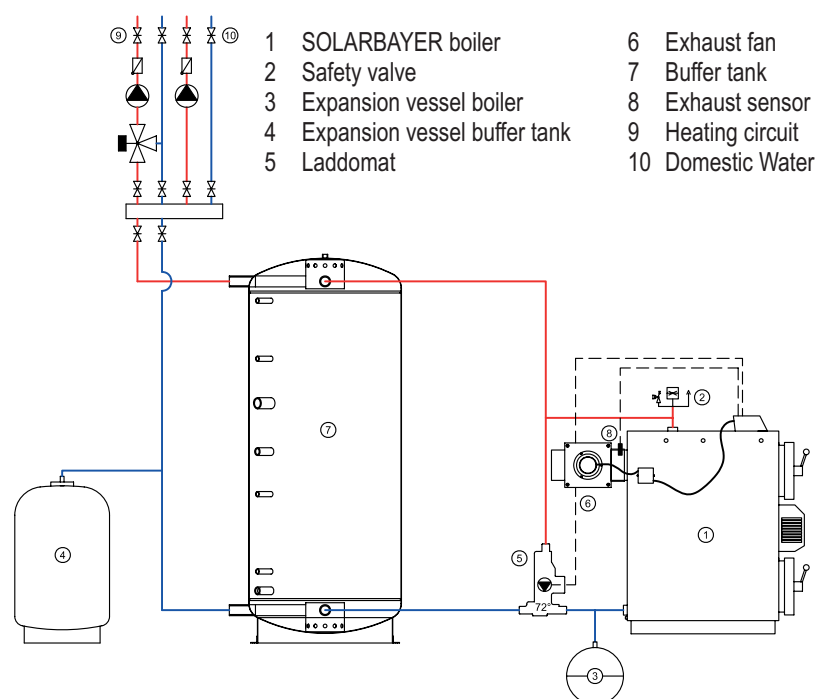
The boiler type is now set

7. Control Unit of the SOLARBAYER boiler

The electronic control unit AK 2000 enables changing and adjustment of the control of SOLARBAYER boilers and the hydraulic integration into central heating installations. Changes in the control software are made by using a password.

7.1 Factory settings (standard settings)

Program 16 with SOLARBAYER Abgastronic



The programme is designed for the control of boilers in combination with stratification systems. After the selection of the programme the boiler is not switched off by the temperature of the outgoing water but by the temperature of the waste gas in the chimney. It is possible to select the shut-down temperature in the configuration program: from 50°C to 150°C (**recommended: 80°C**). The desired boiler temperature can be selected in the menu for temperature settings: from 65°C to 90°C (recommended 90°C). This is standard with SOLARBAYER boilers.

Description of Operation:

The boiler switches from heating-up to heating operation if the exhaust gas temperature is higher than the desired boiler temperature of +30°C. But only on condition, that the boiler has been switched on more than 30 minutes ago. The boiler controls the exhaust gas temperature when heating; if the temperature falls below the value set in the "switch off menu" the boiler turns off. The period of 5 minutes provides for bridging a possible temperature decrease during the shift from the damper to the heating system by the heat exchanger. A temporary increase of the exhaust gas temperature might occur due to a cold heat exchanger.

Circulation Pump - On:

The circulation pump immediately starts when the boiler is turned on for a constant heating up of the boiler.

Circulation Pump - Off:

The pump is switched off when the boiler is switched off. The exhaust gas temperature (switch off) switches off the boiler and the pump. However, if the boiler temperature exceeds the desired temperature (e.g. 90°C) the pump switches on to prevent overheating.

For electrical wiring diagram see attachment 13.2.

8. Initial Operation of the SOLARBAYER-boiler

8.1 Heating Up the Boiler

Prior to heating it is necessary:

- to get familiar with the electronic control unit
- to check the water pressure of the central heating
- to check the connection of the boiler to the mains supply
- to check the operability of the boiler circuit pump
- to check the correct position of the refractory bricks in the combustion chamber
- to check the settings of the secondary air (see chapter 5.5)

Heating up the burner :



- 1** Push the rod of the damper into position "Anheizen/Auf"



- 2** Remove the ash content in the fuel chamber and free the nozzle of all debris using the poker.



- 3** Put a handful of firewood (splinters) and remains of the burned wood of the day before onto the nozzle. Put some small logs, crumpled newspaper and a fire-lighter on top and light the fire.

- **Now close top chamber door**
- **Keep bottom chamber door slightly open at this stage**

(only when an ID fan is connected)

Exhaust fan 90s
boiler temp. ____°C



Press key

The exhaust fan runs for 90 sec. The fume outlet can be extended up to 300 sec by further pressing of the key. The induced draught fan should be running until the boiler is switched on.




- 4** Let the fire burn for about 5 to 10 minutes until proper embers can be seen. Now you can fill the fuel chamber with logs.



- 5** Once the flame can be heard (slightly hissing, blazing) you can close the boiler doors and push the rod into position "Heizen/Zu"

• **Attention:**
ALL DOORS have to be CLOSED.

- 6** Press key  to start heating up. The ventilator operates and the combustion process begins .

- The boiler is now heated up, at a temperature of 72°C the return flow increase opens and the heat is transferred to the buffer tank by the boiler circuit pump.

During combustion, the fuel in the boiler moves towards the firebed. The ash falls through the nozzle and deposits in the combustion chamber. The output of the boiler is automatically controlled by the pre-set temperatures.

The burner shall not be left unattended during the process of heating up.

SOLARBAYER recommendation:

The electronic control unit is delivered with factory settings and pre-wired. It is only the boiler circuit pump of the return flow increase (e.g. the Laddomat 21) and the optional ID fan that have to be wired at the designated strip terminal.

We recommend to leave the boiler temperature set at 90°; this achieves an optimal gasifying effect and the best efficiency. The exhaust gas tract remains cleaner and ash formation is rather low (for settings see chapter 6.3.1)

We recommend leaving the exhaust gas temperature at 80°C, to maintain the firebed over a longer period of time (for settings see chapter 6.3.2.)

The most common reason for malfunctions is air in the heating system constraining circulation. With easy piping, like displayed by the diagrams in the appendix, the air can exhaust on its own.

Please use our piping diagrams and our storage systems, as well as our Laddomat for best return flow increase. Well adjusted systems guarantee functional boiler technics.

These are only tips for heating, please keep in mind that you are heating with a natural product. The wood has to be stored air-seasoned for at least two years. Dry heating material is the basic requirement for an almost smokeless combustion.

8.2 Refuelling the Boiler

Boiler off
boiler temp. ____°C



The boiler is not operating and the fuel control light flashes. The boiler has to be refuelled if more heat is required.

It is also possible to refuel the boiler during the burning cycle. Care has to be taken when opening the fuel chamber door, to avoid smoke exit from the boiler. With chimneys below 8 meter we recommend to install the optional available induced draught fan. But you can also refuel the boiler without an ID fan.

Attention: Make sure that the damper is open (in position “Anheizen/Auf”) to insure proper draft.

The timber logs have to be placed in the fuel chamber in such a way that the fuel chamber door can still be closed. A forcibly closing might damage the door lining.

We recommend that the boiler should only be operated by persons over 18 years of age.

Refuelling *without* induced draught fan

boiler off
boiler temp. ____°C



Press button => boiler switches off

Ventilation 15s
boiler temp. ____°C



press once => fan runs for 15 sec.
Each time the button is pressed again, another 15 sec is added to the running time off the fan.

To avoid smoke rising out off the burner, open door slightly and wait for a few seconds, before fully opening the fuel chamber door.

Ensure doors are closed correctly after refuelling.

Burn-up TURBO
boiler temp. ____°C



Press button to start boiler again

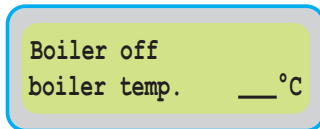
Before refuelling the boiler open the damper (set to **Anheizen/Auf** position)
After closing the fuel chamber door close damper (set to **Heizen/Zu** position)

Refuelling the boiler with induced draught fan „optional“

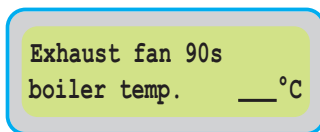
The SOLARBAYER Log Burner comes with a forced draught fan as standard. The electronic control enables the additional connection of an induced draught fan.

The ID fan supports the optimal withdrawal of the fumes out of the fuel chamber when refuelling the boiler. Fumes do therefore not escape through the open door when refuelling.

The ID fan comes as optional equipment and is available in two sizes, 160 mm and 200 mm (depending on boiler size).



Press key, burner is off

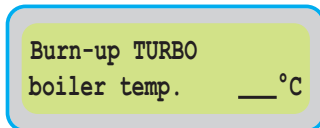


Press key.

Exhaust fan switches on for 90s. Each time the key is pressed, the time will extend by 90 seconds up to a maximum of 300 seconds.

Open the bottom door slightly and wait before open the door fully, to prevent the exit of smoke into the room.

Close all doors fully and tight after the boiler has been refuelled.



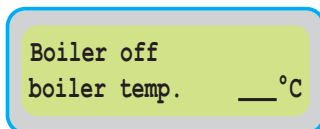
Press key

Boiler starts the heating up phase

It is possible to refuel the boiler during the heating process.

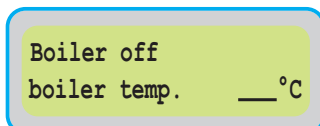
When the ID fan is operated the forced draught fan is switched off automatically.

8.3 Shutting off the boiler



Automatic shut off:

The boiler is shut off when the exhaust gas temperature is lower than the preset switch off temperature. The yellow LED diode is lighting, the display shows "boiler off".



Manual shut off:

Press key.

If heat requirement does no longer exist and the boiler has to be refuelled no more the boiler can be shut off.

NOTE: If the boiler is shut off manually and restarted the boiler program "Burn-up TURBO" is activated. If the boiler is not refuelled and the exhaust gas temperature is already below 120°C the boiler cannot be shut off automatically.

The boiler has to be shut off manually after the combustion.

8.4 Heat Value Chart / Storing of Firewood

moisture content in %		10 %	15 %	20 %	25 %	30 %
Type / Density ¹⁾	Unit	Heat Value in kWh				
spruce	kg	4,61	4,32	4,02	3,73	3,44
379 kg TM/fm	fm	1942	1925	1906	1885	1860
	rm	1360	1348	1334	1319	1302
Pine	kg	4,61	4,32	4,02	3,73	3,44
431 kg TM/fm	fm	2209	2189	2168	2144	2116
	rm	1546	1533	1518	1500	1481
Birch	kg	4,43	4,15	3,86	3,58	3,30
558 kg TM/fm	fm	2748	2723	2695	2664	2627
	rm	1923	1906	1887	1864	1839
Oak	kg	4,43	4,15	3,86	3,58	3,30
571 kg TM/fm	fm	2812	2786	2758	2726	2689
	rm	1968	1951	1931	1908	1882
Poplar	kg	4,43	4,15	3,86	3,58	3,30
353 kg TM/fm	fm	1738	1723	1705	1685	1662
	rm	1217	1206	1193	1179	1163

¹⁾ values in kg dry residue (TM) per solid cubic metre (fm)

Storing of split timber

Freshly cut timber contains between 45 to 60% water. With log wood boilers, however, you can only use timber with a maximum moisture content of 20%. Therefore, it is necessary to dry (season) the timber before use.

We recommend the following for an optimal storing of split timber:

- ▶ store stack of woods protected from rain
- ▶ split into logs before storing
- ▶ create dry ground for storing and keep of the ground to ensure air circulation (e.g. pile on long timbers, etc.)
- ▶ store in wind exposed places if possible (e.g. at the edge of the forest not inside it)
- ▶ when stored closed to buildings ensure gap is left between buildings and logs,
- ▶ try to store logs south facing,
- ▶ put daily requirement of logs in heated rooms (e.g. boiler room to preheat the fuel!)
- ▶ when stored in buildings without special fire protection equipment you have to regard the maximum allowable amount of fuel

9. Boiler Maintenance

9.1 Cleaning the boiler

If dry wood is used and the minimum temperature of the return water is kept at 72°C the contamination in the fuel chamber, the combustion space and the heat exchanger will be kept at a minimum.

Cleaning of the fuel chamber (gasification chamber)

The formation of tar in the fuel chamber (gasification chamber) is a usual effect. We recommend to burn the tar under controlled conditions with slightly opened upper boiler door and heating-up damper. Since the interior walls of the boiler are provided with an aluminium paint coat tar should not be scraped off (applies to SOLARBAYER 25, 40).



New fuel chamber



The fuel chamber after a few days of service. The formation of tar is absolutely normal and is going to be burned off with the regular fuel.

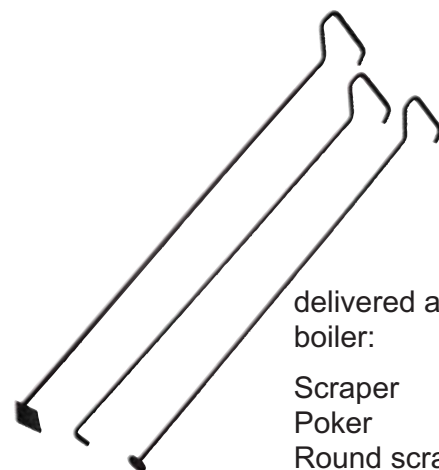
You have to clean the primary air ducts if they are blocked.

An excessive quantity of ash in the fuel chamber which does not fall through the nozzle into the combustion chamber has to be removed.

Ash and dust in the combustion chamber are removed with the scraper. If necessary, the ash in the combustion chamber is to be removed once a week.



Cleaning of the fuel chamber (the picture shows the cleaning of the nozzle)



delivered along with the boiler:

Scraper

Poker

Round scraper

Cleaning the heat exchanger

The pipes of the heat exchanger need to be cleaned once a month. The cleaning period extends itself when the ideal (dry) fuel is used. For the cleaning of the heat exchanger it is necessary to remove the cover to provide access to the pipes of the heat exchanger.

NOTE: Make sure that the boiler room is adequately vented during the cleaning process (dust formation)



Remove the cover of the heat exchanger
(don't use any tools)



Loosen the cover of the heat exchanger
(13mm flat spanner)



Clean heat exchanger with the round
scraper.

Remove turbulators (if installed) before
cleaning

Cleaning of primary and secondary air ducts

Air permeability of the boiler is the fundamental requirement for proper combustion. If you use wood chips as fuel it is necessary to clean the air ducts at least once a season. The removal of the ventilator casing and its sheet metal plate gives space to the primary and secondary air ducts which have to be cleaned with a vacuum cleaner. Afterwards, their air permeability has to be checked.



Loosen the two screws of the ventilator casing and remove cover



Disconnect the cables

Disconnect power before disconnecting the cables



Loosen screws of the sheet metal plate and remove ventilator together with the plate. When mounting them again make sure that the sealing is tight-fitting.



Suck debris from air ducts as shown

Warning!
Before removing ventilator cover disconnect mains supply!

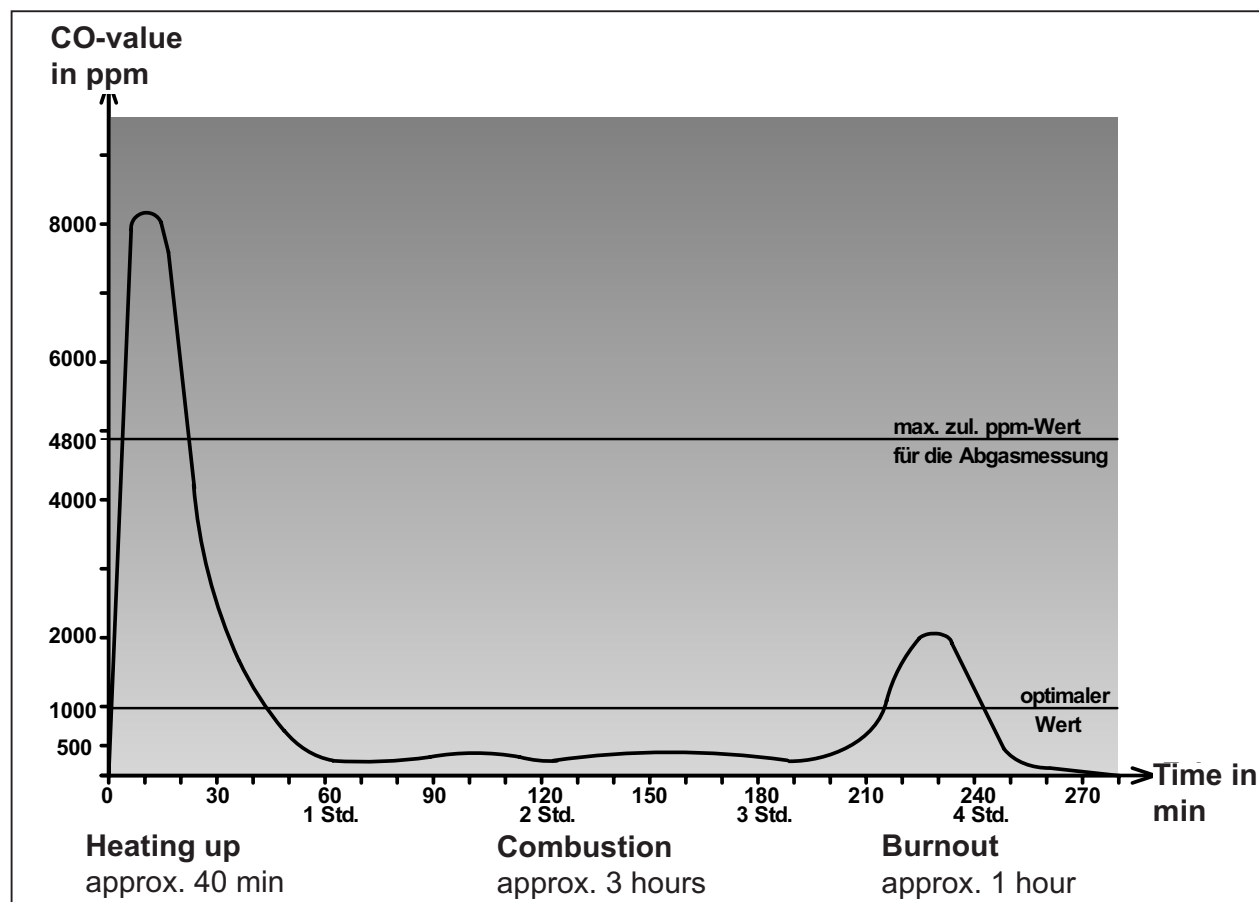
9.2 How to Measure the Exhaust Gases

Please regard the following aspects for exhaust gas measurements:

1. Clean boiler thoroughly about 3 days before measurement
2. The exhaust gas temperature has to be set on 250°C (only while measuring)
3. The buffer tank has to have enough heat capacity (cold buffer tank)
4. Use dry timber with about 10-20% moisture capacity, adjust timber length to length of fuel chamber, edge length about 10-15cm
5. Heat up the boiler approx. 2 hours prior to measurement
6. Pound embers
7. Place wood on the embers, completely fill the fuel chamber
8. Wait for approx. 10 min
9. start exhaust gas measuring

The measurement has to take place when the boiler is fully loaded.

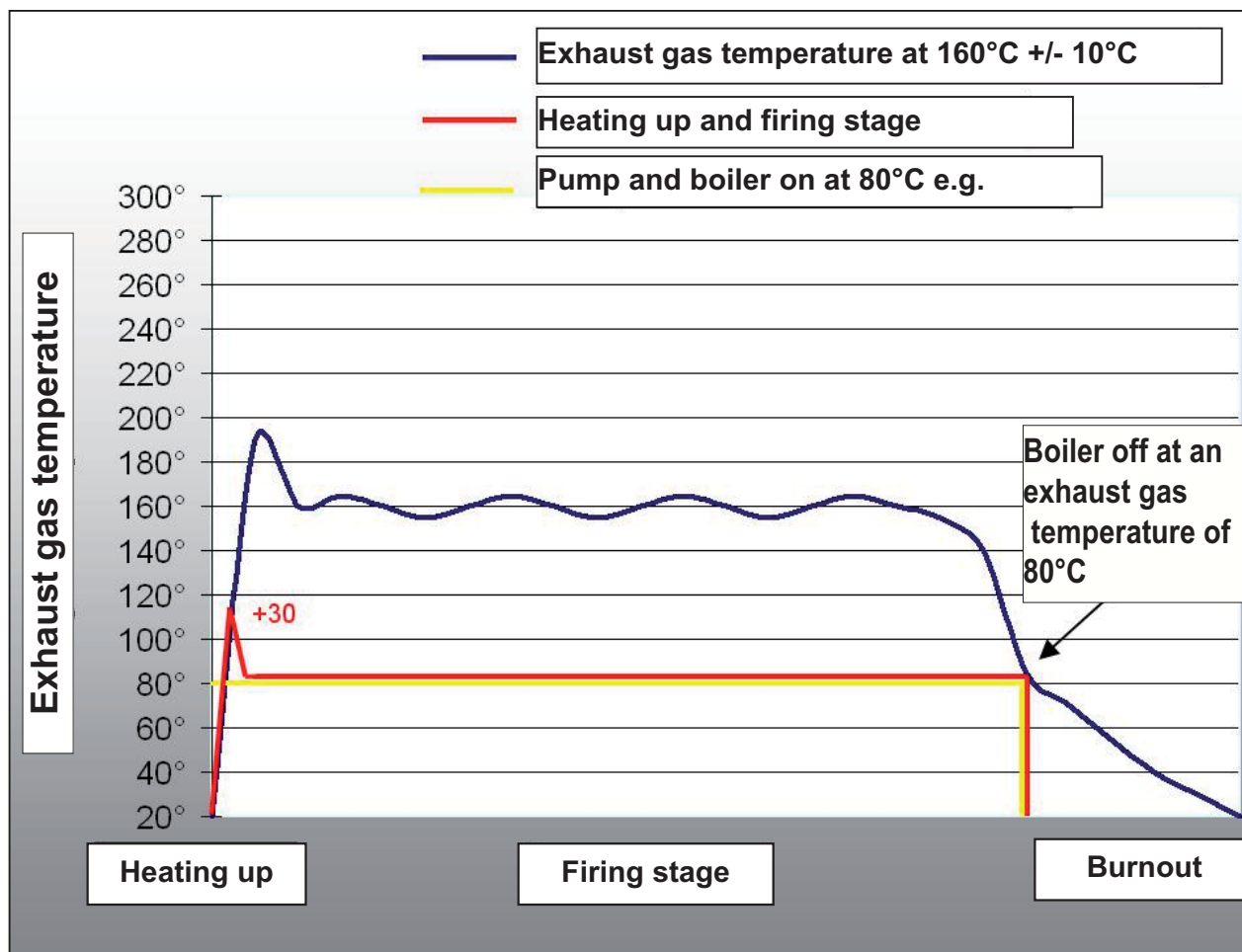
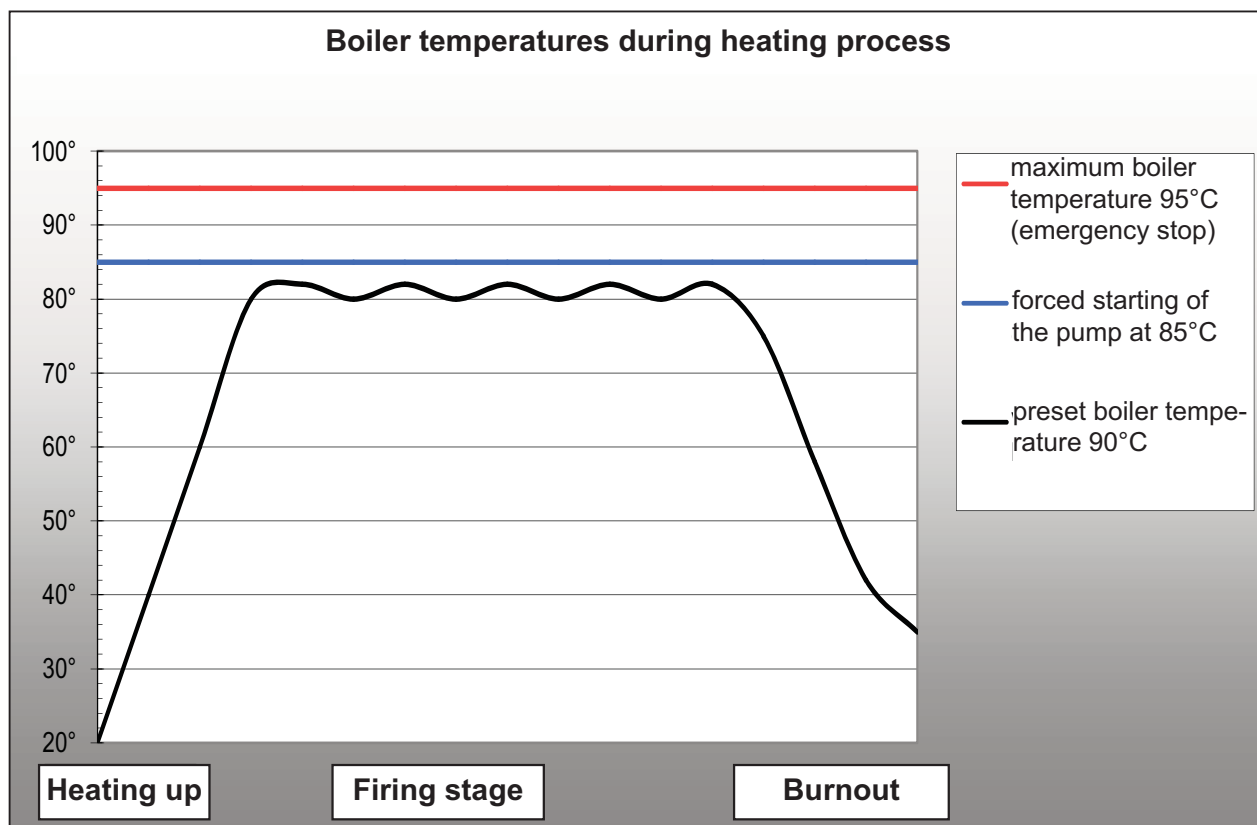
The ventilator capacity of the boiler should be in full service (100%)



The diagram shows that the carbon monoxide output is highest during the heating up process

Therefore, the exhaust gas measurement has to take place during combustion (in the middle of the burn cycle)

9.3 Boiler and Exhaust Gas Temperatures during Operation



10. Maintenance & Repair of the Boiler

The operator is responsible for regular checks and maintenance of the boiler. During operation of the boiler it is necessary to check the pressure, the seal of the boiler doors and tightness of all boiler components and the proper operation of the ventilator.

Tightness of boiler doors:

The boiler doors are fixed at three points: at two pintles and the closing catch. If the door does not fit tightly, it is possible to close the door and to adjust the hinge. By loosening and readjusting the counter nut, the screw of the hinge can be turned and the door can be adjusted.

Tightness of damper:

When cleaning the heat exchanger, check for a clean surface of the damper. A damper that does not close tightly may lead to reduction in the boiler output.

Operation of ventilator:

The most important requirement for a reliable operation of the ventilator is a clean, dust free environment. This has to be particularly regarded.

Wearing Parts are:

- the refractory nozzle
- the seal of the boiler doors
- seal of the heat exchanger casing
- combustion chamber (cf. chapter 5.7)
- turbulators
- all flame-swept parts

Service notes:

Hinges and moving parts have to be greased regularly.

Fan and air ducts have to be cleaned annually.













Pressure nipples for the thermal safety valve have to be checked annually.

Safety devices have to be checked regularly

Regular boiler cleaning, as often as necessary

11. Troubleshooting

Problem	Possible reason	Solution
Power drop.	Boiler is highly contaminated Nozzle is broken The moisture content of the fuel used is too high, wrong timber length	Clean the boiler Check nozzle, exchange if necessary Use dry timber, adjust timber length
After closing the damper the boiler burns for a little while and then only smokes	Secondary air adjustment is incorrect The moisture content of the fuel used is too high, wrong timber length	Check secondary air adjustment Check if the fan flap (blowback flap) of the forced draught fan opens Adjust timber length
After closing the door smoke escapes through the door sealing	Hinge adjusted incorrectly Seal is broken	Adjust door (cf. chapter 5.3) turn around or remove sealing cord of the door
The damper does not open	The damper is covered with tar The moisture content of the fuel used is too high, wrong timber length	Adjust the boiler, exhaust gas and switch off temperature to the Solarbayer settings. Adjust timber length
Smoke comes into the boiler room after opening the damper and the fuel chamber door	Low chimney draught	The chimney has to match the technical requirements (cf. chapter 2.3) Retrofit an ID fan
Cracks in lining	No defect	
Deformation of the steel tank	No defect	
Forced draught fan does not rotate	Starting capacitor is broken STB has released	Replace capacitor Unlock STB
Boiler switches off after heating up	Wrong temperature for boiler switch off selected	See chapter 6.3.2
No display	No tension Fuse broken Motherboard defect	Check fuse and remove when necessary Replace motherboard

Problem	Possible reason	Solution
<p>After mains connection</p> <p>flashes  </p> <p>Error message: "mains failure- check time"</p>	<p>Time and date have not been set before first operation or after mains failure</p>	<p>Set time and date in menu</p>
<p>  flashes</p> <p>Error message: "breakdown therm"</p>	<p>Overheating of the boiler above 95°C</p> <p>Cable broken</p> <p>STB broken</p>	<p>Unlock STB (see chapter 5.9 Safety Temperature Limiter - STB)</p> <p>If the error message does not stop after unlocking, check the cables of the STB and those of the fan</p> <p>Replace the STB</p>
<p>  flashes</p> <p>Error message: "Fuse P02 defect"</p>	<p>Fuse defect</p>	<p>Check the power consumption of the pump</p> <p>Don't use fuses higher than 1A. This may completely destroy the electronics</p>
<p>  flashes</p> <p>Error message: "Thermometer defect"</p>	<p>Temperature sensor broken</p>	<p>Replace temperature sensor</p>
<p>  flashes</p> <p>Error message: "SLEEP"</p>	<p>Malfunction in communication between display and motherboard</p> <p>Communication cable damaged</p> <p>Display or motherboard defect</p>	<p>Check communication cable, if necessary replace</p> <p>Replace display or motherboard</p>
<p>  flashes</p> <p>Error message "open door"</p>	<p>Wrong boiler type selected</p> <p>Display broken</p>	<p>Set boiler type "0" (see chapter 6.4.3 Selecting the boiler type)</p> <p>Replace display</p>
<p>Boiler does not switch off</p>	<p>Necessary heating temperature not achieved</p>	<p>See chapter 8.3 (Shutting off the boiler)</p>

12. Technical Service (Qualified persons only)

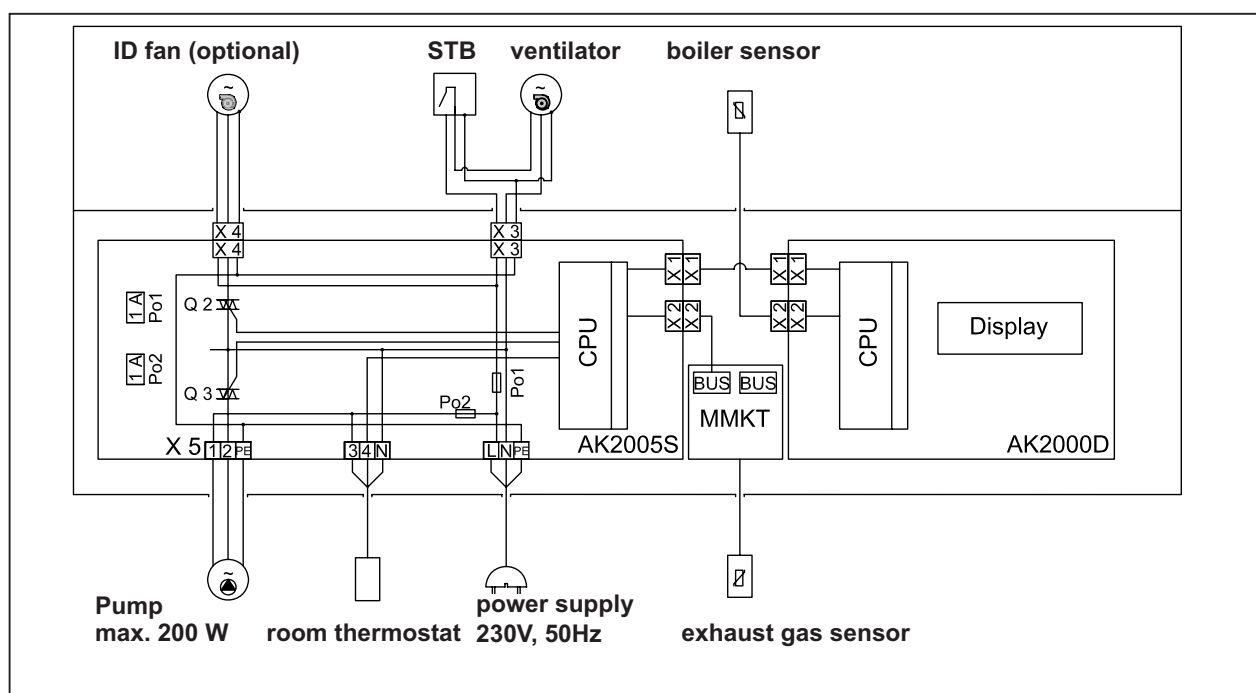
12.1 Software adjustment

For changes concerning the firmware please contact SOLARBAYER



12.2 Wiring Diagram (Qualified persons only)

Electrical connection of exhaust gas thermometer



Always disconnect mains power supply before opening electrical covers to avoid electric shock.
All wiring should be carried out by qualified personnel only!

Components to connect at installation by qualified electrician:

Boiler circuit pump (Laddomat)

Cable 3x 1,5²

ID fan (optional)

Cable 3x 1,5²

Notes

[illegible]

Letter of guarantee Certificate of Quality and Completeness

Product**SOLARBAYER****kW****Product number:**

This letter of guarantee replaces the Certificate of Quality and Completeness for the product.

The manufacturer/producer confirms that the boiler complies with the requirements of the standards and DIN 4702-1, STN 07 0240, STN 07 0245, STN 92 0300, STN EN 305-5, STN EN 61010-1+A2:2000, STN EN 50081-1:1995, STN EN 50082-1:2002, STN EN 6100-3-3:2000, STN EN 6100-3-2:2000+A1+A2:2000.

Checked by:**On:****Selling date:****Date of initial operation:**

Notes for customers and conditions of guarantee

- Claims regarding missing items upon delivery must be made to the supplier in accordance with the regulations of the Code of Commercial Law and the Civil Code.
- Claims with regard to damage and defects due to transport must be made to the carrier by the customer at delivery of goods.
- Period of guarantee is 24 months from selling date.
- Guarantee applies only if the boiler was put into operation by a qualified service engineer. Otherwise the Guarantee Law of the EU applies.
- Guarantee applies only if all electrical installations connected to the controller are connected by a qualified service engineer and if there are specified in the records about the connection of the equipment.
- Guarantee applies to construction, material used and realisation of the product.
- The transport costs of the service engineer are not included in the scope of repair work during guarantee period (transport costs shall be paid fully by the customer).

Guarantee does not include:

- Wearing parts: seals for boiler doors, seals for cover of heat exchanger, seals for ventilator, refractory nozzle, refractory lining and fireclay bricks
- Defects caused by the customer himself
- Defects caused due to not following assembly instructions, improper handling and maintenance or defects caused by handling adverse to the purpose specified or if the product was used for a purpose other than specified; defects caused by bad or improper handling
- otherwise, the regulations of the Civil Code apply to the guarantee.

SOLARBAYER reserves the right of changes made to the product within the scope of product innovation.

Declaration of conformity

Declaration of conformity of the manufacturer according to
the EC-machinery directive 98/32

issued in accordance with § 12 Abs. 3 Buchst. a) of the law
Nr. 264/1999 of the corpus juris and 97/23 EC // 98/32

SOLARBAYER® GmbH
Am Dörrenhof 22
D-85131 Pollenfeld

**TÜV-tested
in accordance with
DIN EN 303-5**



declares on their own responsibility that the products specified hereafter correspond to the requirements of the technical regulations, that the products are safe under the conditions stipulated for their use, and that all steps were taken to ensure the compliance of the following products with technical documentation and the requirements by the corresponding regulations by the Government.

Product: Thermal boilers SOLARBAYER 14.9 to 80
Type: Solarbayer 14.9, Solarbayer 25, Solarbayer 40, Solarbayer 50,
Solarbayer 80
Importer: SolarbayerGmbH

The products listed are in accordance with the following standards:

Thermal boilers for solid fuel in accordance with EN 303-5 and DIN 4702-1,

STN 07 0240, STN 07 0245, STN 07 7401, STN 73 4210, STN 06 1610, STN 03 8240, STN 69 0010, STN 44 352, STN 06 1008, STN EN 303-5, STN EN 287-1, STN EN 287-2, STN EN 50081-1:1995, STN EN 50082-1:2002, STN EN 61000-3-2:2000+A1:2001+A2:2001, STN EN 61000-3-3:2000.

Certificates

TÜV Süd, Munich, dated 04/10/2007, report H-C1 1223-00/07

TÜV Süd, Munich, dated 04/10/2007, report H-C2 1223-00/07

Swiss Fire Regulations dated 20/09/2006, No Z 16498

Fire Regulation Certificate of the Union of Swiss Cantonal Fire Insurance dated 20/09/2006,
No N 16498 (according to VKF)

Declaration of conformity by manufacturer
in accordance with EC-machinery directive DIN 4702-1, -EN 303-5, EMR 98/37
EMV guideline 89/336 Low voltage Guideline 72/23

Place of issue: Pollenfeld

Date of issue: 16.10.2007

Name: Kraus Martin

Title: Managing Director

Signature:

Kraus



We design for your future

Solar systems

Storage systems

Log wood heating

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