VIGAS

Gasifying boilers

MANUAL FOR INSTALLATION, ASSEMBLY, MAINTENANCE AND USE

EXPANDER AK4000

- ❒ **It ensures optimal operating conditions for VIGAS boilers**
- ❒ **It optimally uses all heat sources**
- ❒ **Possibility to choose control of UK according to outside temperature or room thermostat**
- ❒ **Control and adjustment directly from the VIGAS boiler**
- ❒ **Simple assembly and installation**

BH Control

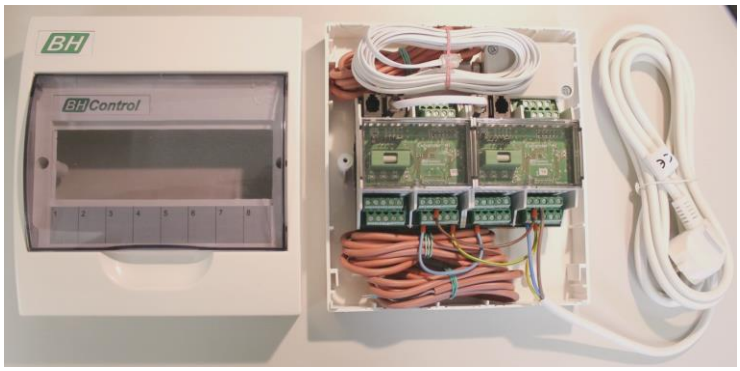
VIMAR 2024
Ver.D 3.00

Contents **Page**

1. EXPANDER AK4000E – TECHNICAL DESCRIPTION

The AK4000E expander is an additional accessory to the AK4000 boiler control. It expands the capabilities of the boiler control system by controlling individual central heating (CH) circuits, including the regulation of the temperature of domestic hot water (DHW) when using multiple heat sources. It allows you to control (CH) using a room thermostat, equithermal regulation (according to the outside temperature) or a combination of them. It allows you to control an external boiler (gas or electric), hot water fireplace pump or solar system together with the ACCU tank. Expander AK4000E is supplied in sets. For individual wiring diagrams, it is supplied as a basic set (code SP 5001) or a double set (code SP 5002). In principle, the basic set controls one mixing circuit and the double set controls two mixing circuits. It is therefore necessary to mount the Expander box on the wall near the controlled circuits and the control unit of the AK4000 boiler so that nothing prevents the introduction of additional cables and thermometers. The box needs a separate 230V/50Hz power supply.

Basic set – (code SP 5001)



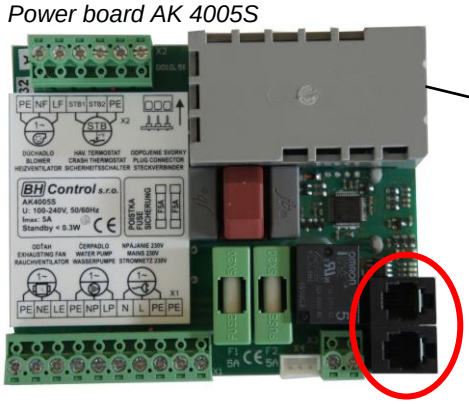
Double set – (code SP 5002)

The basic set includes:
1x AK4000E Expander Module
2x Thermometer type KTY - 1.5m
1x external thermometer (without connecting wire)
1x AK BUS E connecting cable - 4m
1x EU power cord, 230V

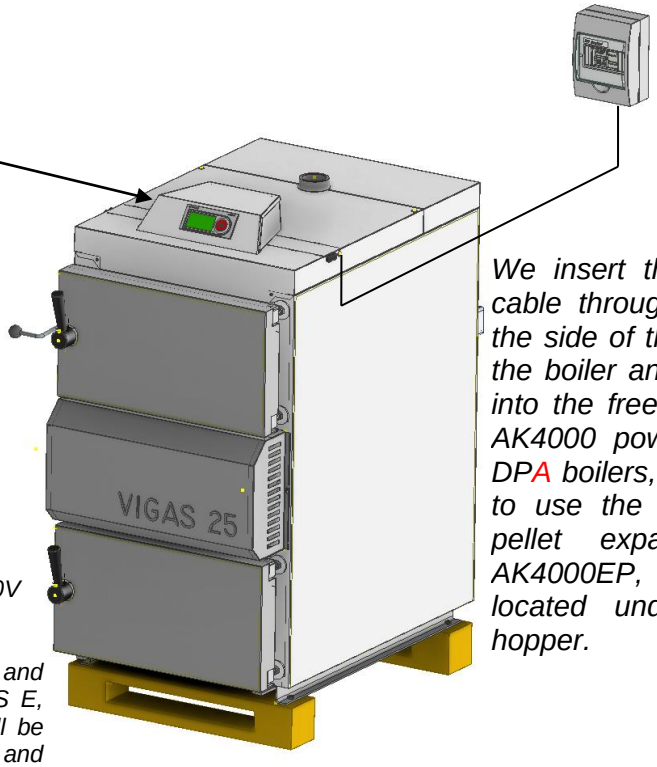
Double set includes:
2x AK4000E Expander Module
3x Thermometer type KTY - 1.5m
1x external thermometer (without connecting wire)
1x AK BUS E connecting cable - 4m
1x EU power cord, 230V

INSTALLATION

Power board AK 4005S



4P4C socket for connecting the AK BUS E communication cable on the AK4005S power board



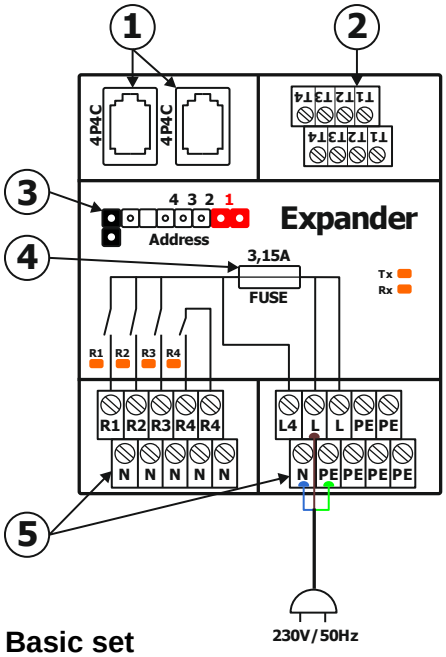
NOTICE:
Do not connect the Expander AK4000 to the 230V network before completing the installation of the cables (thermometers, pumps, servos).
*After connecting the boiler to the 230V network and connecting the Expander AK4000 via AK BUS E, only communication with the boiler display will be active, so that the positions of the inputs and outputs **MENU 7.15**, possible errors **MENU 4** can be detected.*

We insert the AK BUS E cable through the hole on the side of the top cover of the boiler and then insert it into the free socket on the AK4000 power board. For DPA boilers, it is necessary to use the socket on the pellet expander module AK4000EP, which is located under the pellet hopper.

1.1 MODUL EXPANDERA AK4000E

AK4000E Expander module

The AK 4000E Expander module is a basic element of every set. It consists of four inputs and outputs. The use of individual inputs and outputs is conditioned by the currently selected scheme and configuration **(MENU 7.14)** of the AK4000 control system on the VIGAS boiler.



1. BH BUS connector. The bus ensures communication between the boiler and the Expander module, and in the case of a double set, also between the Expander modules.
2. Four inputs for connecting thermometers or a room thermostat. More in the electrical connection table: Inputs, outputs. **Menu 7.15**
3. Addressing Expander modules.

Basic set **- Expander – 1 module - Address 1**

Double set **- Expander -1 module - Address 1**

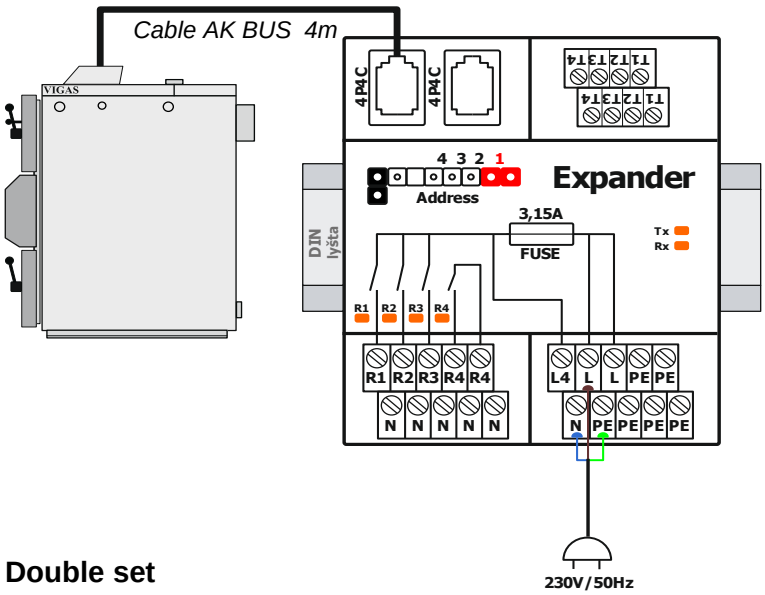
- Expander -2 module - Address 2

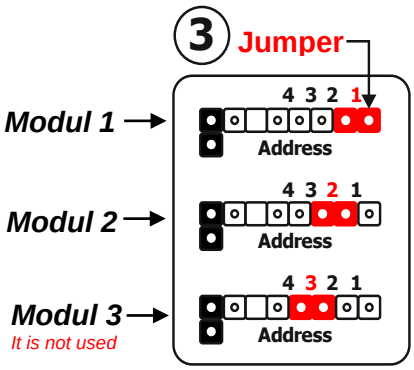
4. Fuse (5x20 3.15A) secures the Expander outputs.
5. Four outputs, R1-R2-R3 – **switches the phase**, R4 and R4 forms a **potential-free contact**. More in the electrical connection table: Inputs, outputs or **MENU 7.15**

Expander module AK 4000E

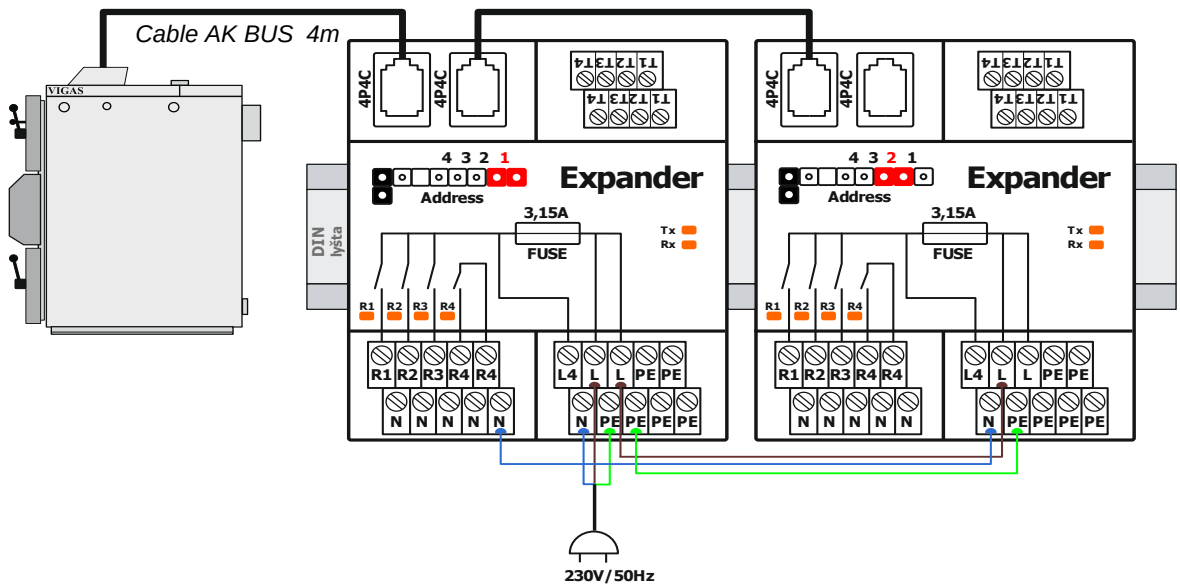
Code SP 5004

Basic set





Double set



1.2 Thermometer type KTY

Attachment thermometer type KTY. It is supplied in a length of 1.5 m. The recommended installation is approx. 0.5 m behind the mixing valve (three-way or four-way circuit). The active metal end must be positioned so that it touches the pipe as much as possible and wrapped with insulating material. The thermometer wire is made of silicone material for temperatures up to 150 0C and is suitable for placement under pipe insulation. If necessary, the conductor can be extended up to a length of 20 m.

The **basic set contains 2 pieces**, the **double set contains 3 pieces** of thermometer.

NOTE: For a given wiring diagram, check the number of thermometers used. If necessary, the thermometer can be ordered separately (code SP 1004).

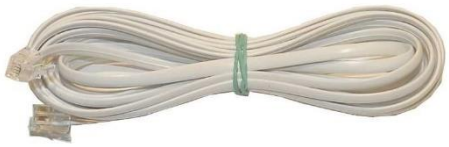
1.3 Thermometer external type KTY

External (external) thermometer type KTY. It is delivered without a driver. The recommended installation is on the north side of the building up to a height of approx. 2m above ground level. **The set always contains 1 pc**.

WARNING:

In the event that the thermometer cannot be placed correctly and the thermometer heats up, e.g. the surface on which it is placed, it is possible to correct the outside temperature in the range of 0 to -5^{0}C. More in MENU 7.11.

1.4 Connecting cable AK BUS E



The connecting cable AK BUS E is used for communication between the Expander set and the AK4000 boiler control unit. Length 4m.

The set always contains 1 connecting cable.

NOTICE:

Any free 4P4C connector on the AK4000E Expander module and the AK4000 power board can be used for connection. In the case of VIGAS DPA boilers on the AK4000 EP module.

1.5 Thermometer for ACCUMULATION (ACCU) type KTY 4m

Attached thermometer for ACCU tank type KTY. It is supplied in a length of 4 m. Installation in the well in the upper part of the AKU tank is recommended. The thermometer wire is made of silicone material for temperatures up to 150 ^{0}C and is suitable for placement under pipe insulation. If necessary, the conductor can be extended up to a length of 20 m.

NOTICE:

The Expander set does not include this thermometer. If necessary, order separately (code SP 3032) or use a free thermometer (code SP 1004) and extend as needed.

1.6 Thermometer for KRB and SOLAR type PT1000

Attached thermometer designed for measuring the temperature of the chimney in the case of a hot water fireplace and measuring the temperature in the solar circuit. It is supplied in a length of 0.5m or 1.5m. The thermometer wire is covered with stainless steel wire. If necessary, the conductor can be extended up to a length of 10 m.

NOTICE:

The Expander set does not include this thermometer. If necessary, order separately

Code SP 3027 - 0.5m

Code SP 0703 - 1.5m.

2 Additional accessories of Expander AK4000

According to the selected hydraulic scheme (MENU 7.14), it is possible to connect additional accessories to the Expander AK 4000 module, which ensure optimal operating conditions and at the same time comfortable operation of the VIGAS boiler. The control system is set so that the boiler is always protected. The condition for opening and controlling the heating and hot water circuits is a minimum boiler temperature of 60^{0}C.
Conversely, in the event of a threat of boiler overheating above 95^{0}C due to the heating of all circuits CH and DHW, from the point of view of safety, the CH and DHW circuits can be gradually opened safely so that only excess heat is dissipated into CH or DHW. In this boiler protection mode, the set maximum temperature for individual DHW and DHW circuits is used.
More in MENU 7.1 and 7.2. If there is still insufficient heat dissipation, the release valve is activated together with the cooling safety exchanger. More in chapter 3.10.

2.1 Pump or two-way solenoid valve

The AK4000 Expander control system is designed to control pumps with a connection voltage of 230V/50Hz. Both standard and electronic pumps can be used. The operation of the pump for the given circuit is shown by the flashing pump pictogram on the graphic display diagram. Switching the DHW pump on or off depends on the DHW temperature, the state of the room thermostat (ON, OFF) for the given circuit and the heating requirement for the given circuit.
In addition to the pump, the two-way valve with a connection voltage of **230V/50Hz** can be used for hot water heating.
The advantage of using a two-way valve compared to a pump is that, when the valve is closed, hot water is not pushed into the DHW tank from other pumps and thus does not cause an unwanted increase in the temperature in the DHW tank.

The choice of pump or electric valve for DHW heating must be assessed by the plumber mainly based on the distance from the heat source. **It is set in MENU 7.9.**
Electrically, the pump or solenoid valve is connected to the Expander module to the contacts according to the electrical connection table for the selected scheme. MENU 7.14.
R – phase (230V/50Hz) brown or black conductor color.
N – zero, blue conductor color.
PE – ground, green-yellow conductor color.

2.2 Actuator with four-way or three-way valve

The AK4000 Expander control system is designed to control a servo drive with a connection voltage of 230V/50Hz and a transition time from 30 to 300s. Our offer includes the products of the Swedish company ESBE:
- Servo drive ESBE ARA 661, 120s, 230V, (code SP 0643/A)
- Three-way mixing valve ESBE VTC 131, 1", (code SP 0646/A)
- Four-way mixing valve ESBE VTC 141, 1", (code SP 0646/B)
The choice of the appropriate valve size must be assessed by the plumber.
NOTICE:
Servo drives from other manufacturers can also be connected to the Expander module, but they must meet the requirement of 230V/50Hz and a transition time in the range from 30 to 300s.

Electrically, the servo drive is connected to the Expander module to the contacts according to the electrical connection table for the selected scheme. **More MENU 7.14.**
R1 – 1 **ON** phase (230V/50Hz) valve opening.
R2– 1 **OFF** phase (230V/50Hz) valve closing.
N – zero, blue conductor color.
PE – ground, green-yellow conductor color.

2.3 Room thermostat

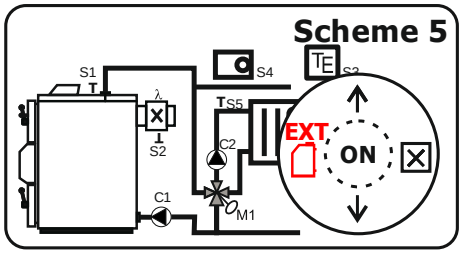
The control system of the Expander AK 4000 makes it possible to control heating circuits using a room thermostat. After choosing a suitable scheme, it is possible to choose the option "no" or "BIN" for the room thermostat. More in MENU 7.1, 7.2.
"no" - the room thermostat will not be used
"BIN" - binary room thermostat (standard room thermostat)
If "BIN" is selected, the given circuit will be controlled by the room thermostat. The "Heated space" status (reach of the set temperature in the room) is signaled on the boiler display**„1 OFF“,** the actuator is moved to the closed position and the pump for the given circuit is subsequently switched off. The state "Heating" is signaled **„1 ON“.** The given circuit is heated to the desired (set) or calculated (equithermal) temperature. The pump always works in the "Heating" state for the given circuit. All types of potential-free room thermostats can be connected to the AK4000 Expander, i.e. j. such that no electric current flows through the contacts. We recommend using temperature sensing with settings in increments of **0.2 ^{0}C**. (standard after 0.5 ^{0}C).
Electrically, the room thermostat is connected to the Expander module to the contacts according to the electrical connection table for the selected scheme. **More in MENU 7.14.**

2.4 Cooperation of the VIGAS boiler with the ACCU tank

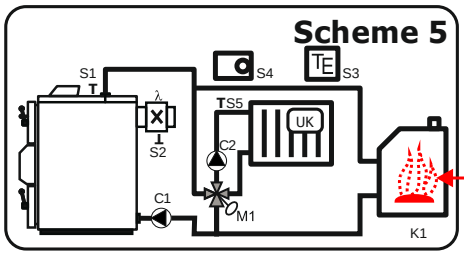
By default, in VIGAS boilers, one load is sufficient for 12 hours of operation, which means that less than 30% of the nominal power is used. From the point of view of the life of the boiler, it is advantageous if the boiler works at least at 50% of the rated output. When connecting a VIGAS boiler with an ACCU tank, 100% of the boiler's power is used to achieve the desired boiler temperature. If there is a demand for heating at the same time, 100% of the boiler's output is divided into recharging the ACCU tank and heating. In this case, the tank is recharged only by the excess output of the boiler. Due to the fact that the boiler and the ACCU tank are hydraulically connected to each other, the temperature in the ACCU tank and in the boiler rises to the required temperature of the boiler together. After this temperature is exceeded by 1^{0}C, the boiler goes into attenuation mode. In the case of "PELLET" fuel, the boiler must be overheated by up to 3^{0}C (MENU 7.19 parameter 15) in order for the boiler to shut down completely. In damping mode, tank charging and heating are controlled only by pumps. A big advantage of the control system used is that in the damping mode it is possible to add "WOOD" fuel to the boiler at any time without overheating the ACCU tank, which in practice extends the time between adding fuel. The boiler will only be reheated if the required temperature to (CH, DHW) is higher than the temperature in the ACCU tank, or if the temperature in the ACCU tank drops to the set value. The depletion temperature of the ACCU tank can be set from 20^{0}C to 90^{0}C. After the fuel burns out and the chimney temperature drops to the boiler shutdown temperature **end** the boiler shuts down. In the case of the VIGAS DPA combined automatic boiler, after the "WOOD" fuel has burned out, the boiler can automatically switch to the "PELLET" fuel and continue heating for several more days.
NOTICE:
For all hydraulic connections with the ACCU tank, it is necessary to place the sensor in the nipple or under the insulation in the upper part of the ACCU tank so that the full volume of the ACCU tank is used.

2.5 External boiler

The control system of the Expander AK4000 allows you to connect and control the switching on of an external boiler (gas or electric). We use contacts R4 and R4 on the Expander AK 4000E module for this. It is possible to connect an external boiler in two ways:
1. By using the contact of the external boiler to connect the room thermostat. These are fed to the AK4000E Expander module on R4 contacts. In this case, the control of the external boiler will be performed by switching the contact of the room thermostat of the external boiler. The external boiler must be switched on. This connection is advantageous if the external boiler is also used for hot water heating.
2. Another option to control the external boiler is to connect the supply voltage (phase L) of the external boiler via contacts R4. In this case, the external boiler will be switched on and off using the relay via contact R4.
In the case of choosing a scheme with an **external boiler (see MENU 7.14)**, the option to switch on the external boiler will be added „ “.
Pressing "Enter" will display the circular controller. With a button„◄“ it is possible to choose the boiler to be used. After selection„ “ and confirmed**„ON“** will turn on and the external boiler will work. The control system also enables automatic switching on of the external boiler after the fuel has burned out and the chimney temperature has dropped to the set value**„ end “. See MENU 1 - Settings for "Aut" mode.**



◄ - choice of turning on the VIGAS boiler or the External boiler. By confirming **"ON"**, the selected boiler will be switched on manually.



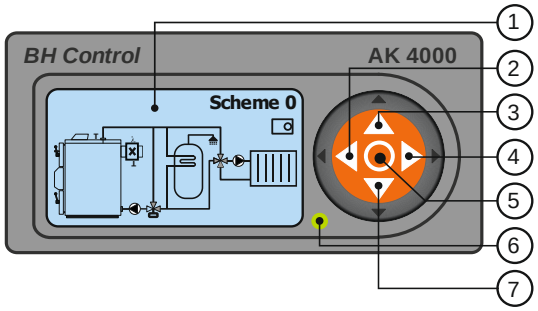
Operation of an external boiler

2.6 Hot water fireplace “KRB”

The Expander AK4000 control system allows you to connect and control a hot water fireplace pump. We recommend connecting the fireplace to the ACCU tank and ensuring the water flow with a fireplace pump. The pump is automatically switched on whenever the fireplace heats up and the set chimney temperature is reached. More in MENU 7.17.
NOTICE:
As a temperature sensor, use a thermometer type **PT1000 (code SP 3027).** Place the thermometer in the chimney neck of the fireplace.
The Expander set does not include this thermometer. If necessary, it can be ordered separately in two lengths:
Code SP 3027 - 0.5m
Code SP 0703 - 1.5m.

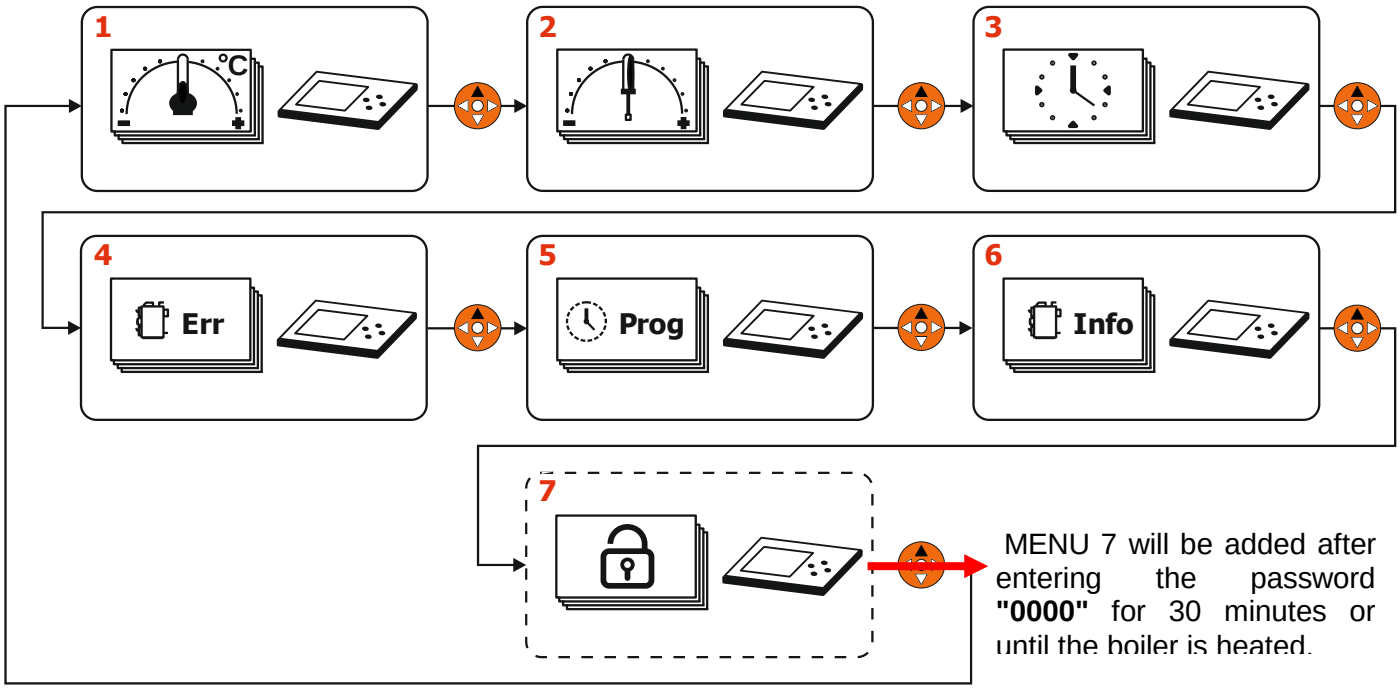
3. CONTROL AND ADJUSTMENT OF THE AK4000 CONTROL SYSTEM

Control and setting options depend on the selected program and the current configuration of the boiler. Part of the electronic regulation is a control panel with buttons, boiler status symbols and a display. The functions of the individual buttons are combined and depend on the accompanying text shown on the display.



1. Graphic display 128 x 64 pixels
2. Button ◄ with functions, input
3. Button ▲ with functions
4. Button ► with functions, exit (ESC)
5. Button ● (ENTER) with function - short, long press
6. LED light (**green OK**, **red error (ERR)**
7. Button ▼with functions

7.1 MENU STRUCTURE - BASIC SETTINGS



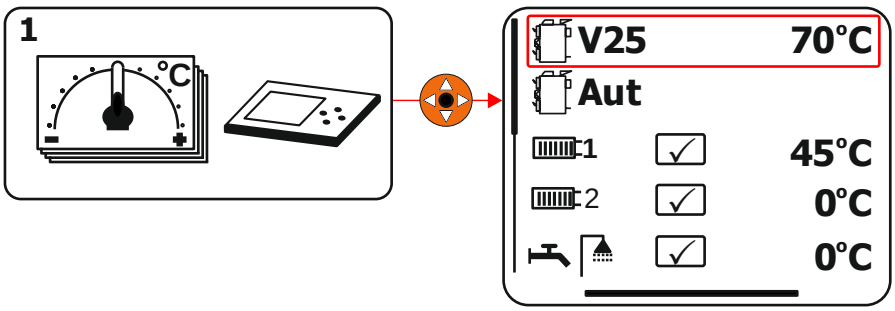
MENU 1 – Temperature setting
MENU 2 – Boiler parameters setting (Boiler operating instructions)
MENU 3 – Clock setting
MENU 4 – Error messages
MENU 5 – Setting the time program (only in the case of schemes with Expander AK 4000)
MENU 6 – Information on hardware and software (Boiler operating instructions)
MENU 7 – Service settings under password

4. MENU DESCRIPTION - BASIC SETTINGS

MENU 1 – TEMPERATURE SETTING

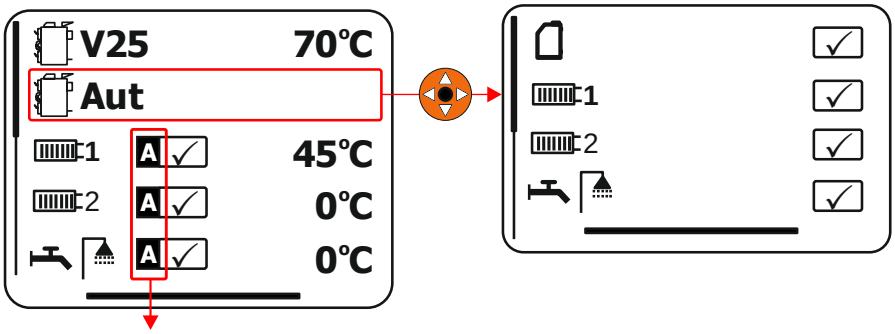
For the basic hydraulic connection schemes - Scheme 0 to Scheme 4 - it is possible to set only the boiler temperature in **MENU 1**. After expanding the control system with the additional accessory EXPANDER AK4000 and selecting Scheme 5 or more, the "Temperature setting" MENU will be supplemented with the setting of the temperatures of the CH, DHW circuits and their priorities with the option of heating in case of fuel burnout in the VIGAS boiler. Burnout and shutdown of the boiler is signaled by the **AUT** statement. The display of individual options depends on the selected scheme.
See MENU 7.14.

Setting the desired boiler temperature



V25 - setting the desired temperature for the VIGAS 25 boiler. The standard setting range is from 70°C to 85°C. In **MENU 7.11**, it is possible to increase the range up to **90°C** if necessary **(connection with ACCU tank)**.

Setting for mode „Aut“



If the VIGAS boiler is already in "AUT" mode, which is shown by the symbol„ A „ circuit control continues to the displayed temperature.

Aut - "Auto" mode is a special state of the VIGAS boiler after the fuel has burned out, when the chimney temperature„ end „ drops below the set temperature. **More in MENU 2** (Instructions for operating the boiler). This boiler status is displayed only for Schemes 5 and above. In this mode, the VIGAS boiler is shut down, but in the case of an external heat source such as an ACCU tank or an external boiler, the heating of the CH and DHW circuits can continue.

external boiler (gas or electric)

✓ - after switching to **"Aut"** mode, the external boiler is automatically switched on.

off - after switching to **"Aut"** mode, the external boiler remains switched off.

1, 2, - heated circuit CH1, CH2, DHW.

✓ - after switching to the **"Aut"** mode, standard heating of the CH1, CH2 and DHW circuits occurs.

off - after switching to the **"Aut"** mode, the CH1, CH2 or DHW circuit remains **unheated**.

\+ - heating priority. It can be assigned to only one of the circuits. If the marked circuit is not heated to the desired temperature, **the other circuits will be unheated.**

Setting the desired temperature for the central heating (CH)circuit- 1, 2

The temperature setting of the heated circuit depends on the control method of the given CH circuit. It can be controlled (according to the choice of the operator) according to the outside temperature, the so-called equithermal heating **1** , according to the room thermostat **1** or a combination thereof.

NOTICE:

The choice of equithermal regulation and room thermostat can be selected for each heated area separately. For example circuit CH1 1 can be regulated on the basis of equithermal regulation and room thermostat, but CH2 circuit 2 only based on the room thermostat. More in MENU 7.1 and 7.2.

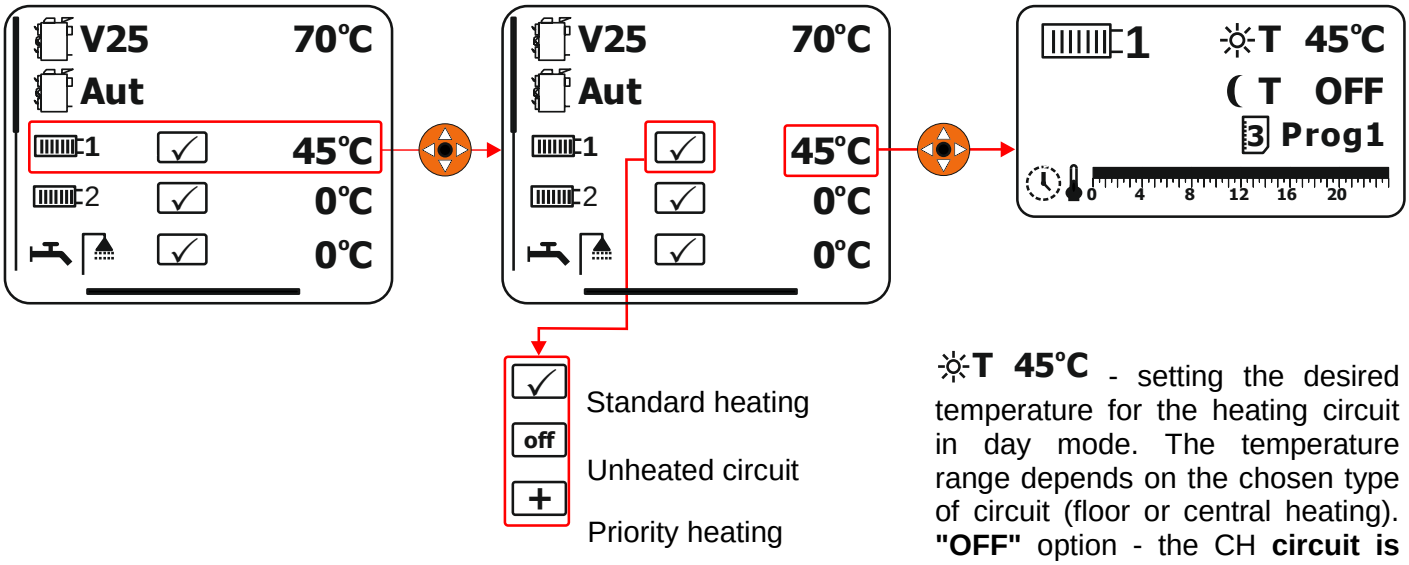
The desired temperature can be set in two ways:

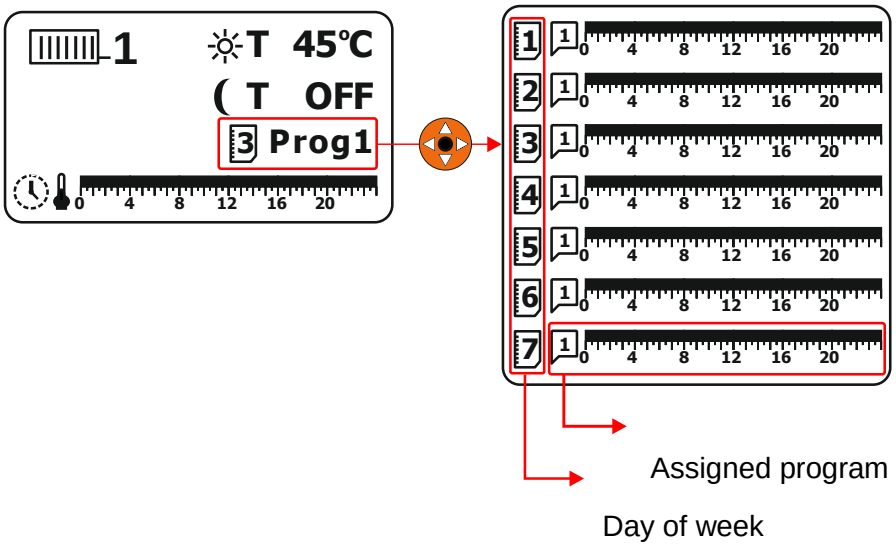
- by directly setting the desired temperature for the CH and DHW circuits.

- by control according to the outside temperature "equithermal regulation".

Heating control directly to the desired temperature:

If the equithermal heating option is not selected**„ 1 - no“** the temperature of the heated circuit is entered directly. Control of the heating circuit to the selected temperature only takes place if the temperature of the VIGAS boiler exceeds 60^{0}C (this does not apply if the VIGAS boiler is already in **"Aut"** mode, see above) and the room thermostatis in the "ON" state. The CH circuit pump always works if the CH temperature is higher than the desired CH temperature, the servo drive is open (1-100%) and the room thermostat is in the **"ON"** state. In the case of a heated space (room thermostat in the **"OFF"** state), the servo drive gradually closes to 0% and the pump of the CH circuit is subsequently switched off.





T 45°C - setting the desired temperature for the heating circuit in day mode. The temperature range depends on the chosen type of circuit (floor or central heating). **"OFF"** option - the CH **circuit is**

(T OFF - setting the desired temperature for the CH circuit in attenuation (night) mode. The temperature range depends on the chosen type of circuit (floor or central heating). **"OFF"** option - the CH circuit is switched off.

3 Prog1 - the created program can be assigned to the selected day of the week. See menu 5.

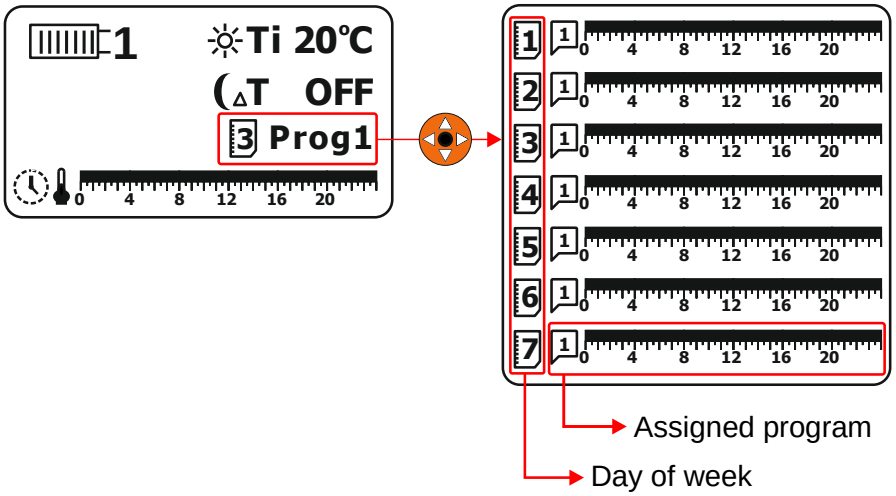
Control according to the outside temperature "equithermal regulation"

If the equithermal heating option is selected TE **1 - „yes“,** the temperature of the heated circuit is calculated automatically based on three parameters:

1. outdoor temperature,
2. parameter "T0", (temperature at outside temperature 0^{0}C)
3. parameters of the desired temperature in the room "Ti" (interior temperature).

Outside temperature - part of the Expander AK4000 set is a box with a thermometer (ch. 6.2.3.3) for measuring the outside temperature. We recommend mounting the box on the north side of the building for correct measurement of the outside temperature. If necessary, it is possible to correct the measured temperature, see **MENU 7.11**.

Parameter "T0" - setting of the equithermal curve. At the outside temperature **T - 0^{0}C**, the temperature of the heated circuit will be regulated to the set value, see MENU 7.1 and 7.2. For example, if the temperature is set to 50 ^{0}C for the "T0" parameter, it means that at the outside temperature 0^{0}C, the temperature of the water to the CH will be regulated to 50^{0}C (at "Ti" = 20^{0}C). The setting of the parameter depends on the heating system and the insulation properties of the object.
The parameter of the desired temperature in the room "Ti" - the parameter serves to increase or decrease the temperature of the water in the heating circuit (advancement of the equithermal curve). For example, if we increase the "Ti" parameter to 22^{0}C, then at T0 = 50^{0}C the temperature will be regulated to CH at 52^{0}C, i.e. +2^{0}C. In the case of a combination of "equithermal regulation" and a room thermostat, the **"Ti"** value can be chosen with a larger margin, because when the desired temperature is reached in the room **(heated space - room thermostat status "OFF")**, the servo drive closes and the given circuit will not be heated.
Recommendation to the boiler operator: To increase or decrease the temperature for the regulated circuit, use the parameter **"Ti"** in particular, which is normally accessible and it is not necessary to enter the password to change **"T0".**



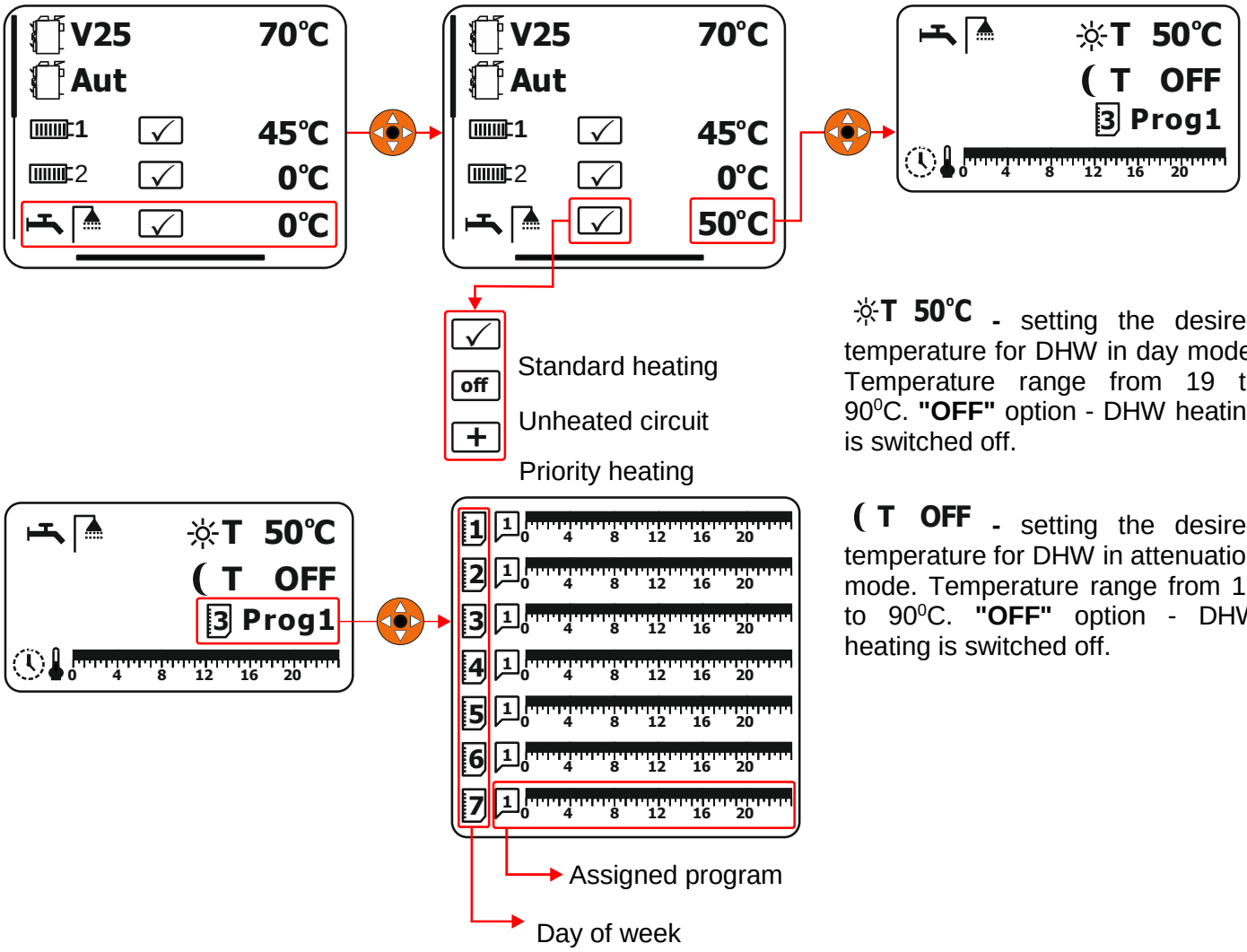
Ti 20°C - setting the desired temperature in the room (interior). Range from 10 to 30^{0}C. **"OFF"** option - the CH circuit is switched

ΔT OFF - setting the temperature attenuation in the room (interior). Range from -7 to -1^{0}C. **"OFF"** option - the CH circuit is switched off. The temperature in the heated CH circuit is reduced by the set

3 Prog1 - the created program can be assigned to the selected day of the week. See menu 5.

Setting the desired temperature for hot domestic hot water (DHW) -

Domestic hot water (DHW) heating is controlled by means of a pump or electric valve (open without voltage), see **MENU 7.9**. The DHW is heated to a comfortable (daytime) or reduced (nighttime) temperature. From a practical point of view, it is advantageous for DHW to use only a comfortable temperature.

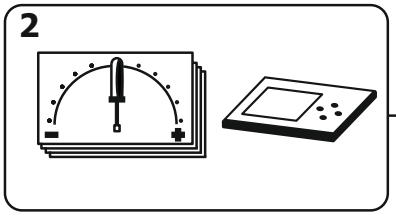


T 50°C - setting the desired temperature for DHW in day mode. Temperature range from 19 to 90°C. **"OFF"** option - DHW heating is switched off.

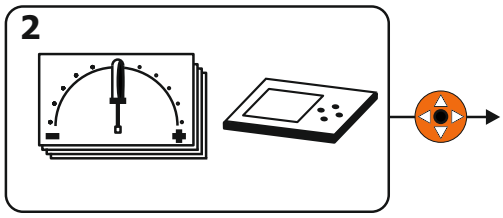
(T OFF - setting the desired temperature for DHW in attenuation mode. Temperature range from 19 to 90°C. **"OFF"** option - DHW heating is switched off.

MENU 2 – SETTING THE BOILER PARAMETERS

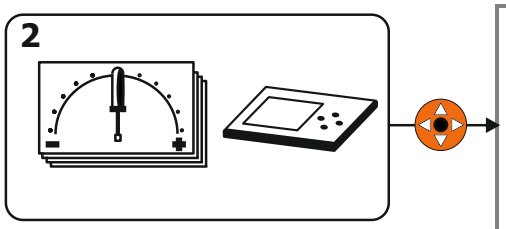
Attention: Setting the parameters of the boiler in MENU 2 depends on the type of boiler, the configuration of the boiler and the selected fuel.



max	**Maximum chimney temperature - WOOD** The maximum flue gas temperature at which the EBM fan speed is reduced. The temperature can be set in the range from 130°C to 320°C. The temperature setting depends on the quality of the fuel and the chimney draft. **The recommended value is 220°C.**
end	**Boiler shut-off chimney temperature - WOOD** The flue gas temperature at which the boiler and boiler pump will automatically shut down. The temperature can be set in the range from 20°C to 130°C. The chosen temperature can influence the size of the burning base for the next heating. If the value is set to low, the fuel will burn completely, if the value is too high, ash may accumulate in the fuel tank. Recommended temperature: **- connections without ACCU tank 50°C,** **- connection with ACCU tank 80°C and more.**



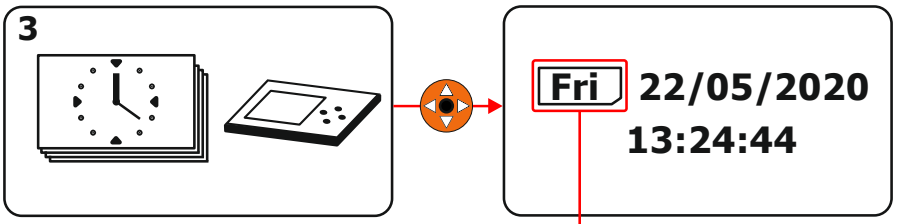
λ	**Choice of "lambda" value - WOOD - Lambda Control** The "lambda" value determines the excess of oxygen in the flue gas. The recommended value is **1.35,** which represents approx. 6% O_2. The value can be set in the range from 1.2 to 1.5. By increasing the O_2 content in the flue gas, the efficiency of the boiler decreases and harmful emissions increase.
△	**EBM fan speed correction – WOOD** By increasing or decreasing the value, you change the nominal output of the boiler. The value can be set in the range from -3 to +3. One level represents about 10% of the boiler's output. Setting the value to **"0"** corresponds to the nominal boiler output parameter. In the transitional heating period, we recommend reducing the value.
△	**EBM fan - DPA speed correction** By setting the fan correction△ it is possible to increase or decrease the amount of supplied air in the case of **DPA** boilers. The value can be set in the range from **-5% to +25%**. Setting the value to **"0"** corresponds to **EN Plus A1** pellet quality. The correction can also be used for: Low chimney draft correction.....+ High chimney draft correction..... - Lower quality pellets correction.....+
min	**Correction of minimum fan speed EBM – WOOD** By increasing it, you change the value of the minimum fan speed. The value can be set in the range from 0% to 70%. The recommended value is **0**.
MinT	**The minimum temperature in the ACCU tank WOOD, DPA** Setting the minimum temperature in the ACCU tank. The display is active only if the hydraulic scheme with the AKU tank is selected. Adjustment range **25–70°C**. If the boiler exceeds the desired temperature **by 1°C**, the boiler will go into the attenuation state„ “. If the boiler exceeds the desired temperature by **parameter 15 (DPA) or parameter 25 (WOOD),** the boiler will be completely shut down. See MENU 7.19. The boiler will only be reheated if the required temperature for CH, DHW is higher than the temperature in the ACCU tank, or if the temperature in the ACCU tank drops to the set value.
on	**Setting the exhaust fan operation** If the exhaust fan is installed and selected (see MENU 11), it can also be used to increase the efficiency of the chimney by means of permanent operation. The speed can be set from **30% to 100%** or completely turned off by setting it to **"OFF"**. If the percentage of continuous operation is selected, the exhaust fan works in parallel with the push fan.



Δ	**Correction of the performance of DPA boilers** Performance correction Δ can be used to increase or decrease the pellet dosing time in one period. The value can be set in the range from **-3 to +3.** One correction step = change of dosing time in one period **by 0.5s.** The correction can be used to achieve optimal combustion of pellets, or to adjust the boiler performance. For pellet quality according to the **EN Plus A1** standard, we recommend setting the correction to the value **"0"**. The set correction is reflected in the displayed maximum boiler output.
	Choice of DPA boiler fuel type The VIGAS DPA boiler is a semi-automatic boiler for burning pellets and pieces of wood. When using "PELLET" fuel, it is necessary to select a graphic symbol„ “ . When using "WOOD" fuel, it is necessary to select a graphic symbol„ “.
Start	**Cooling fan start temperature – TVZ** You select the flue gas temperature at which the cooling fan turns on. The value can be set in the range from **70°C to 220°C**. The recommended value is **120°C**. When the selected value is reached, the fan turns on. The cooling fan switches off **10°C** below the switch-on temperature.
→	**Automatic selection of transition WOOD – PELLETS** When the **"AUTO"** mode is selected, **"WOOD"** will occur after the fuel has burned out and the flue gas temperature has been reached end to automatically switch to **"PELLET"** fuel and then continue burning with pellet fuel.
☼	**Display brightness** You choose the brightness value of the display. The value can be set in the range from **0 to 100**.
◐	**Display contrast** You select the display contrast value. The value can be set in the range from **16 to 24.**
Roll	**Option to scroll the data of the display info row** By selecting **"yes"**, the current values of the boiler are gradually displayed in the information line of the display. For example boiler output, boiler temperature, flue gas temperature, etc.. When choosing **"no"**, select the data in the information line with the buttons▲▼.

MENU 3 – SETTING THE CLOCK

Attention: Correct setting of the real date and time is important for the functionality of the Expander AK4000 programs.



22/05/2020 –
Selection of the current date in the form of DD/MM/YYYY. Selecting the current date automatically adjusts the day of the week.

13:25:44 - Selection of the current hour in hh:mm:ss format.

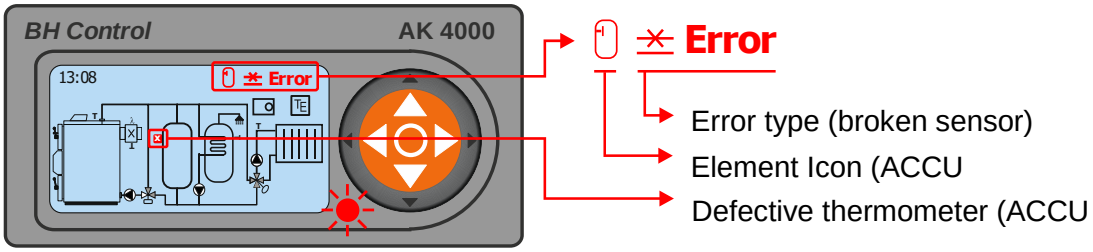
Days of the week:
Mon - Monday, Tue - Tuesday, Wed - Wednesday,
Thu - Thursday, Fri - Friday,
Sat - Saturday, Sun - Sunday.

MENU 4 – ERROR MESSAGES

In general, if the boiler is switched off, the **"OFF"** LED does not light up. In the **"ON"** state of the boiler, the LED lights up.

If all elements of the boiler are fault-free, the LED lights up (green). In the event of an error, the LED lights up (Red).
The error description is displayed:
1. statement in a text line
2. listing in the error MENU 4

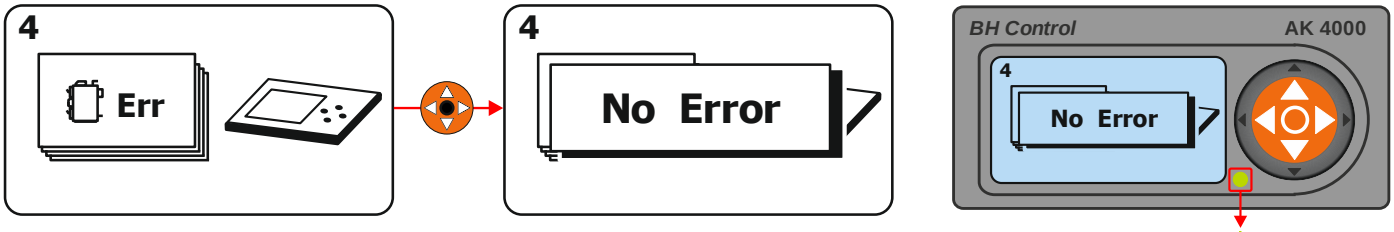
1.Listing in a text line (example of a broken ACCU tank temperature sensor)



Typ	DESCRIPTION OF A PROBLEM	SOLUTION
	Interrupted (not connected) sensor.	Checking the wiring, replacing the sensor.
	Sensor short circuit.	Checking the wiring, replacing the sensor.
	Interrupted sensor input.	Checking the cabling, routing the cabling outside the power line.
COM	Communication error with the module.	Checking the communication cable, checking the power supply of the module (23V/50Hz), replacing the module.
I2C	Communication error with the measuring transducer.	Replacement of the module (power board, Expander) on which there is an input with this error.
STA	Error processing commands in the module.	SW update, replacement of the module on which there is an input with this error.
U	Supply voltage error for Lambda probe, low voltage.	Checking the 12V power supply, replacing the power Lambda board.
H	Too little current in the lambda probe heating circuit.	Checking the wiring (interrupted wiring), replacing the Lambda probe.
H	Excessive current in the Lambda probe heating circuit.	Checking the wiring, replacing the Lambda probe.
	Servo control voltage too small.	Checking the wiring, checking the movement of the servo, checking the batteries, replacing the servo, replacing the lambda board.
	High auger motor temperature	Check the auger (jawed auger), check the engine temperature sensor.
Low battery	Battery voltage too low.	Checking the batteries, checking the battery holder, checking the leakage of batteries into the electronics.
Exchange battery	Dead batteries	Battery replacement. (2x 1.5V – AA)

1. Error listing in error MENU 4

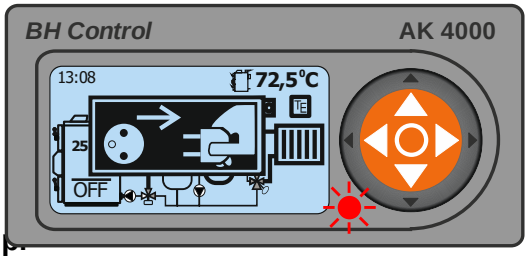
All available errors are always displayed in error MENU 4, that is, errors displayed in the text line as well.



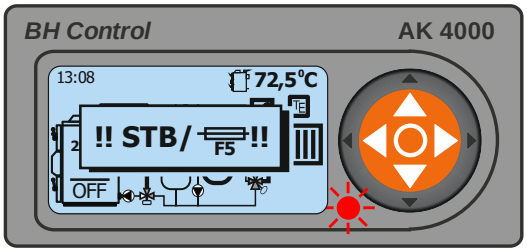
NO FAILURE

FAILUR

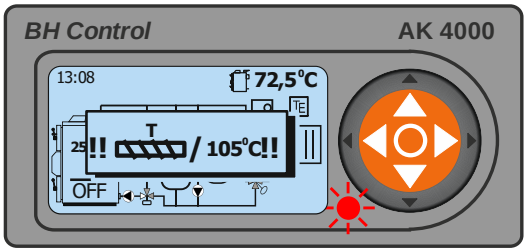
2. Faults and warnings on the display



Main power:
Short-term power failure (230V, 50Hz) without affecting the function of the boiler. If the warning appears frequently, check the supply voltage, use a different supply phase. By confirming the central button "●" we delete the listing.
Warning: In the case of DPA or Lambda control boilers, in the event of a power failure, the air supply is closed by self-propelled (preventing the boiler from burning by the draft of the chimney), which can result in short battery life (2x 1.5V – AA) in case of frequent power failures..

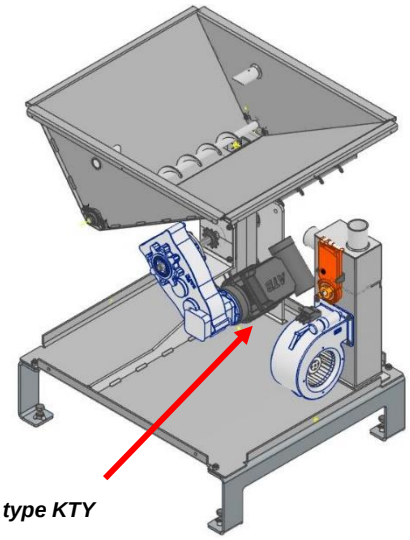


STB / FUSE 1A, STB / FUSE 5A,
STB / FUSE, STB
Emergency thermostat error or blown fuse on the power board. Check fuses (1A, 5A) or emergency thermostat. In the event of a "STB" failure, the boiler may have overheated. The thermal fuse has been activated (see picture). In this case, the blower fan is disconnected from the voltage. The boiler can only be switched on again after the mechanical protection "STB" has been pressed, while the temperature of the boiler must drop below 60 ^{0}C, or after replacing the fuse. You can turn the boiler on again by confirming the center button "● ".

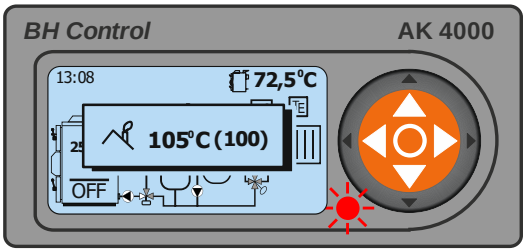


High auger motor temperature T

The safety temperature of the screw motor is set to **100^{0}C**. If this temperature is exceeded, the boiler will be shut down. The cause may be mechanical jamming of the screw..



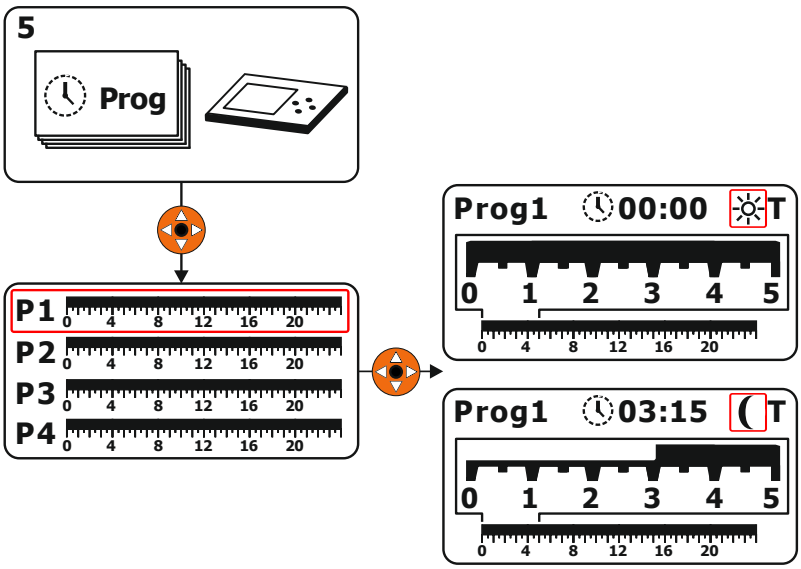
Engine thermometer type KTY



High flue gas temperature
The warning is displayed for DPA boilers. The condition for starting pellet ignition is a lower chimney temperature than 100^{0}C. During the discharge, the blower fan works, reduces (cools) the chimney temperature below 100^{0}C, and only then can the boiler switch to pellet ignition mode. The reason for reducing the stack temperature is so that the pellet ignition process does not start at a high stack temperature, which could result in the system evaluating the pellets as not igniting, while the pellets burn.
The listing will automatically go out below a temperature of 100^{0}C. See chapter 5.6.

MENU 5 - TIME PROGRAM SETTING

The time program determines the use of comfort„ ☼ „ (daily) and attenuation „☾„ (night) temperature in the heating circuits. The control system of the Expander AK4000 allows you to set up to 16 different time programs in 15-minute intervals. Each CH and DHW heating circuit can be assigned one of 16 independent time programs for each day of the week.
MENU 1 - Setting the temperatures of the CH and DHW circuits.



By pressing repeatedly, we set the heating to a comfortable (daytime) temperature.

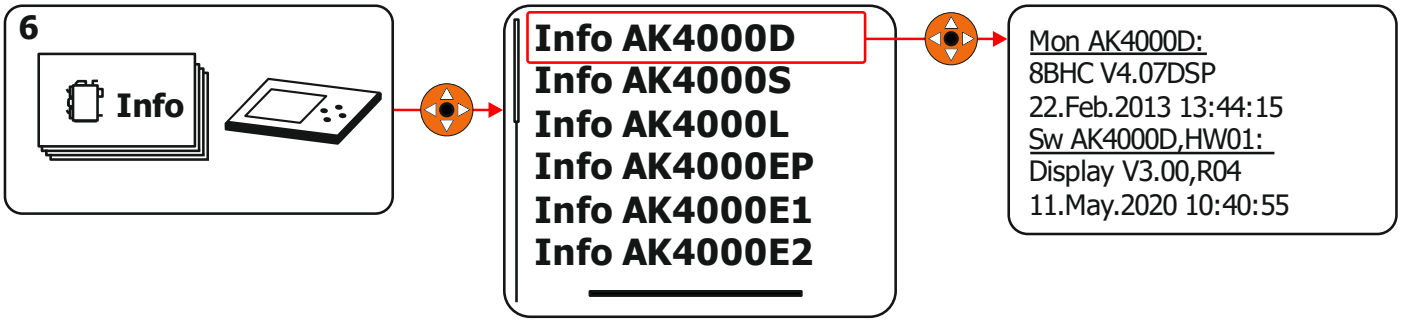
Use the right and left buttons to move along the 24-hour timeline.

By pressing repeatedly, we set the heating to the attenuation (night) temperature.

Use the right and left buttons to move along the 24-hour timeline.

MENU 6 - HARDWARE AND SOFTWARE INFORMATION

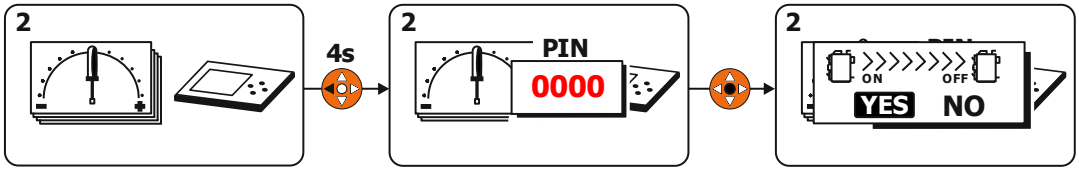
If a service technician needs it, MENU 6 is used to find out the current software and hardware used in individual modules. Only used modules are always displayed. Example of display of the used AK4000D module.



MENU 7 – SERVICE SETTINGS

MENU STRUCTURE - PASSWORD SETTING "0000"

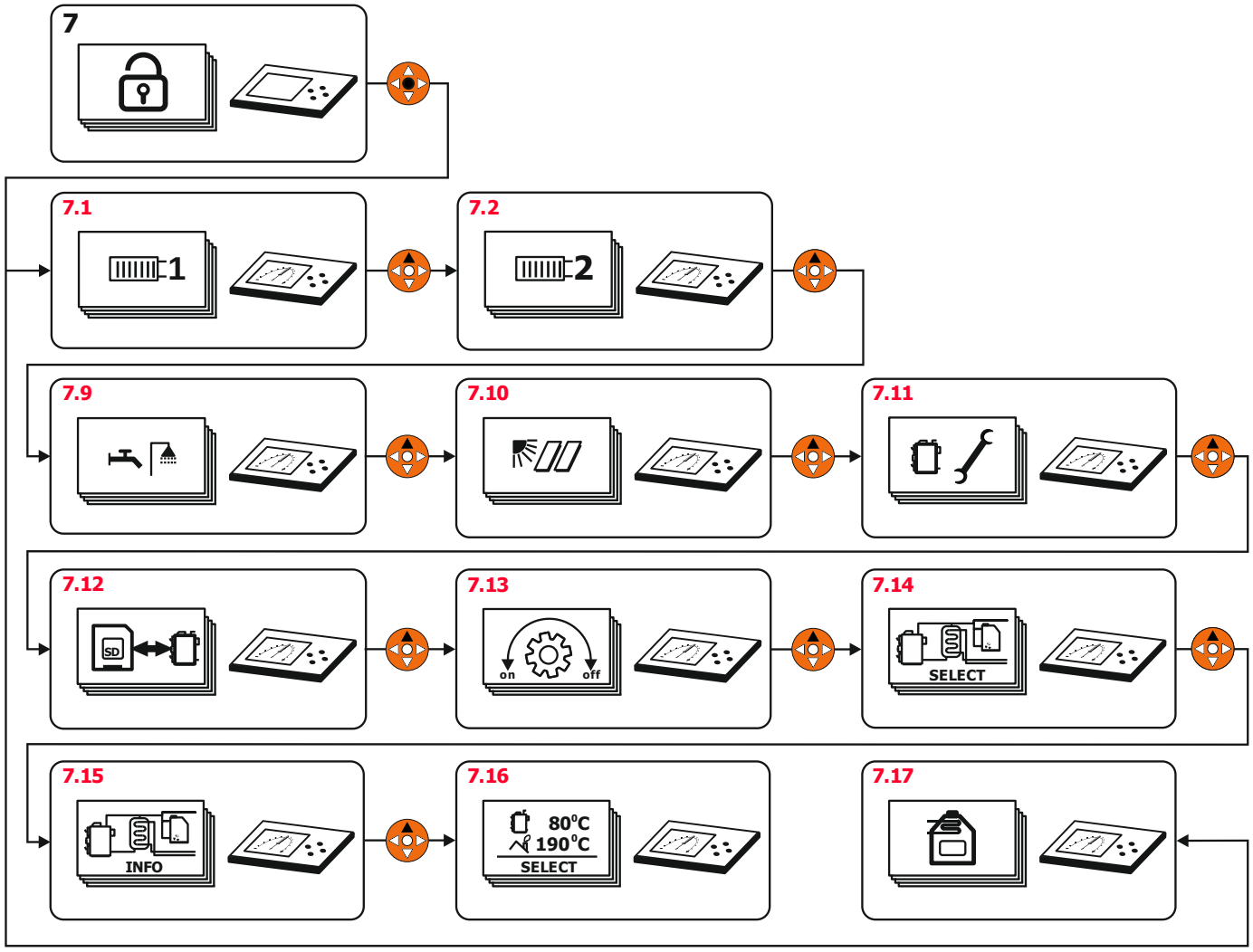
Service settings under the password PIN 0000 are used only in reserved cases. These settings must only be performed by a professionally trained service technician (if necessary, also by the customer). In the service settings, the type of boiler with accessories, the hydraulic wiring diagram of the boiler, etc. is set.



When entering the menu under the password if the boiler is switched on, it is necessary to switch off the boiler first.

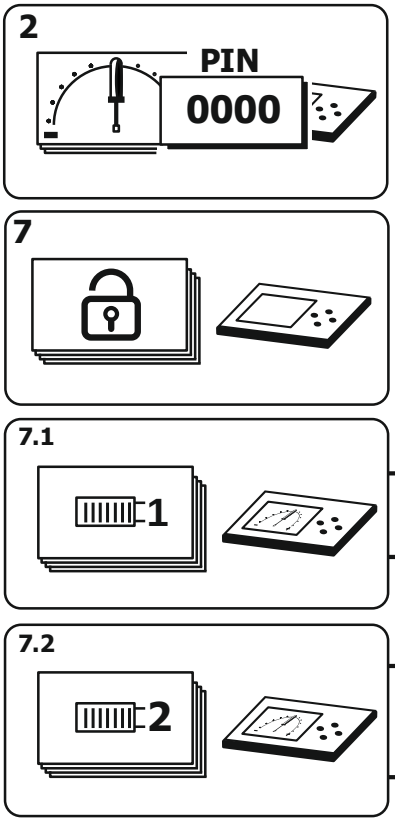
MENU STRUCTURE "7" - SETTINGS UNDER PIN PASSWORD "0000"

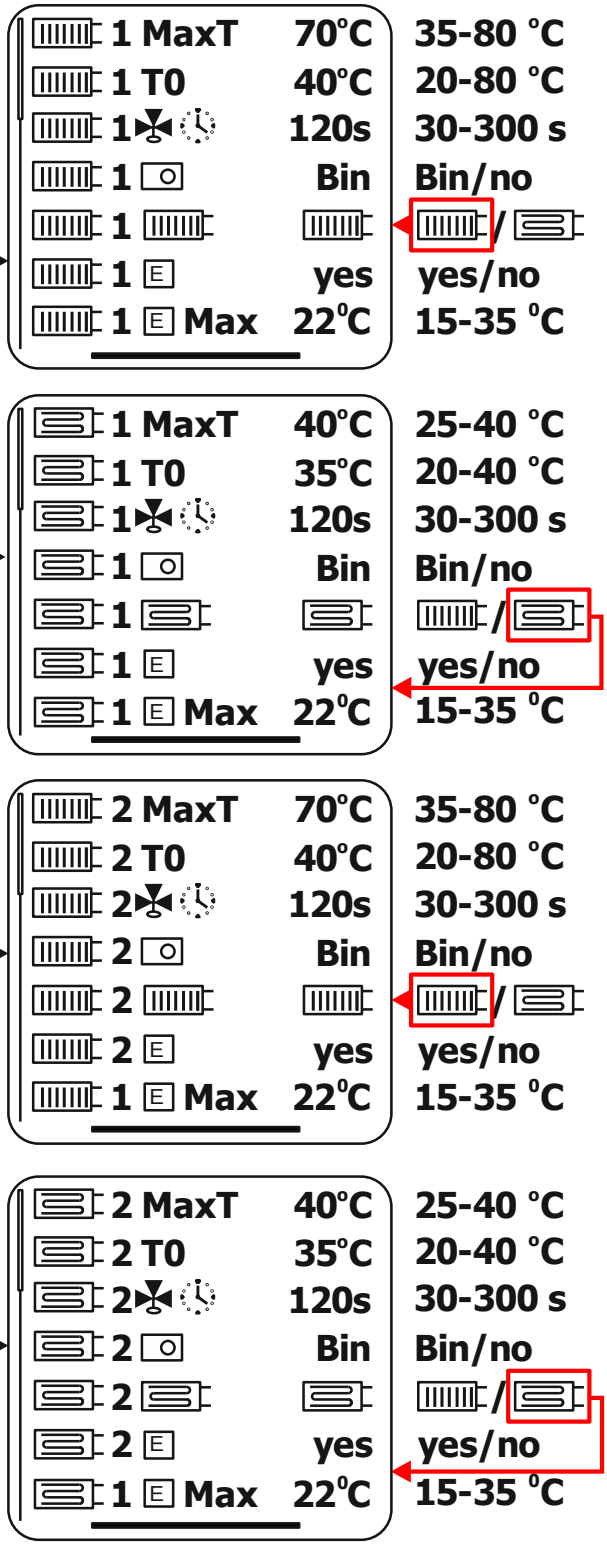
The menu structure depends on the selected hydraulic scheme in MENU 7. Only the MENU related to the selected hydraulic scheme will be accessible.



MENU 7.2, 7.2 – Settings for central heating (CH) circuits
MENU 7.9 – Settings for domestic hot water heating (DHW)
MENU 7.10 – Settings for solar heating
MENU 7.11 – Setting boiler parameters
MENU 7.12 – Settings for the AK4000M module
MENU 7.13 – Service control of movement
MENU 7.14 – Boiler hydraulic diagram settings
MENU 7.15 – INFO - installation
MENU 7.16 – Settings for line display
MENU 7.17 – Settings for hot water fireplace

MENU 7.1, 7.2 SETTING THE HEATING CIRCUIT OF THE CENTRAL HEATING SETTING UNDER PASSWORD "0000"





MaxT - setting the maximum temperature for the heated circuit / .

T0 - setting the equithermal curve. At an outside temperature of **T-0°C**, the temperature of the heated circuit will be regulated to the set value. When the outside temperature changes, the system automatically recalculates the required temperature for the heated circuit.

1 - setting the transition time of the servo drive of the heated circuit. The data is indicated on the packaging of the servo drive in

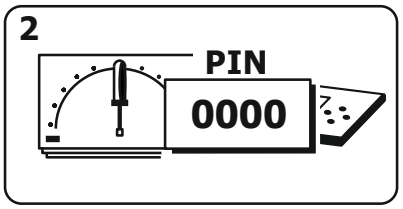
1 - room thermostat setting BIN- Binary / no - none for the given circuit.

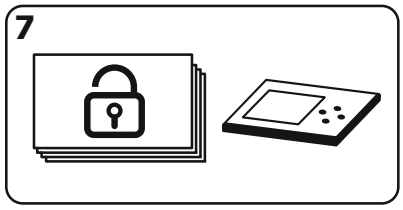
1 - heating circuit setting
- central heating
- in-floor heating

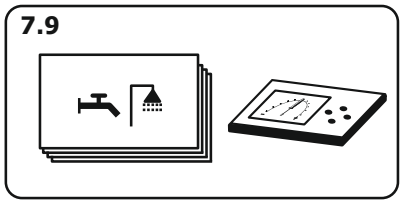
1 E - setting of equithermal heating (according to the outside temperature) of the heated circuit.
yes - no.

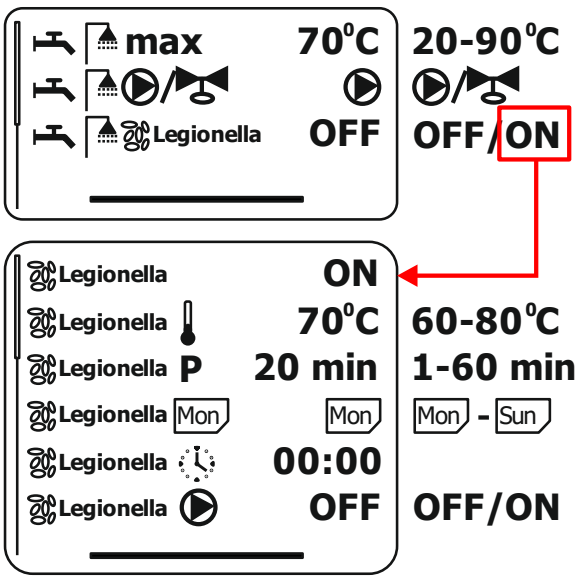
1 E Max - setting the maximum outdoor temperature for equithermal regulation. If the outside temperature reaches the set temperature, the CH circuit will not be heated (servo closed, pump off).

MENU 7.9 DOMESTIC HOT WATER (DHW) HEATING SETTING SETTING UNDER "0000" PASSWORD









max - setting the maximum temperature for domestic hot water (DHW).
Warning: If there is a threat of overheating of the boiler, the temperature „**max**“ used for faster cooling of the boiler (the DHW pump is switched on or the electric valve is opened). The excess heat of the boiler is thus used to

- For DHW heating, it is possible to use a pump or a two-way electric valve with a voltage-free open function. The controlled element must be selected according to the design of the hydraulic diagram CH.
- pump
- solenoid valve open without voltage

Legionella - setting protection against Legionella.
OFF
ON

Legionella - temperature setting for the destruction of water bacteria.

Legionella P - setting the holding time **(parking)** for the water bacteria destruction temperature

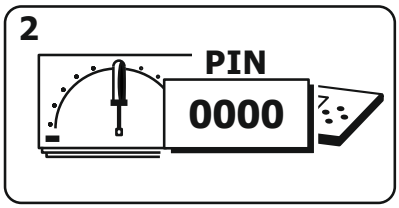
Legionella Mon - setting the day of the week for the destruction of water bacteria.
Mon - Monday

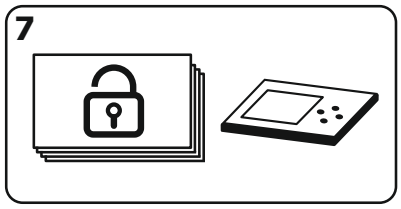
Legionella - start time setting.

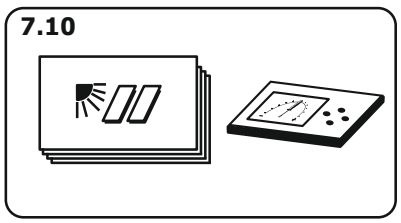
Legionella - setting the pump to turn on at the time of bacteria destruction.

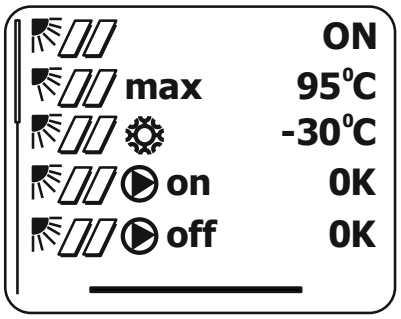
Legionella is a dangerous water bacterium found in warm water. The bacterium reproduces intensively in the range of 20-50°C. Bacteria do not multiply above 50°C and die above 70°C. The AK4000 regulation allows you to set the overheating of the DHW tank once a week according to the selected parameters to destroy the Legionella water bacterium.

MENU 7.10 SOLAR HEATING SETUP SETTING UNDER "0000" PASSWORD









	ON	ON/OFF
max	95°C	30-250 °C
☼	-30°C	-30 - 5 °C
on	0K	0-15K
off	0K	0-15K

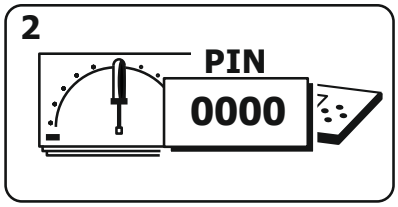
- zapnutie, vypnutie solárneho okruhu.
„ON“ – switched on
„OFF“ - switched off

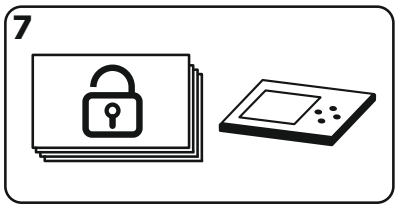
max **-** setting the maximum temperature in the solar circuit. If the temperature exceeds the set value, the pump in the solar circuit is switched off.

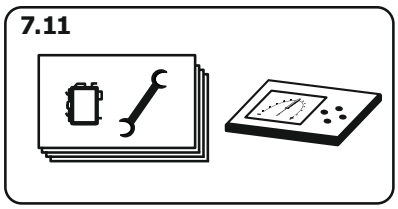
☼ **-** setting the minimum temperature in the solar circuit. If the temperature drops below the set value, the pump in the solar circuit is switched off.

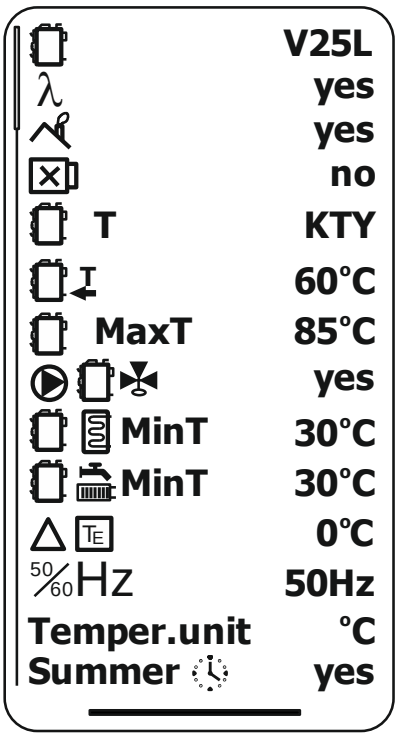
on, **off** **-** Hysteresis of turning on and off the pump in the solar circuit with respect to the temperature of the circuit that is heated from the solar circuit.

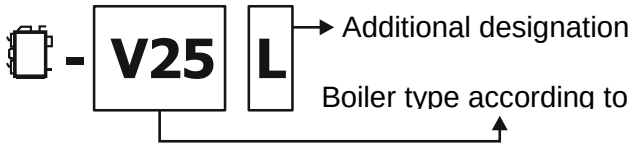
MENU 7.11 SETTING THE BOILER PARAMETERS SETTING UNDER "0000" PASSWORD











Attention:
The boiler type designation together with the additional designation must always match the designation on the boiler's nameplate.
When the boiler is switched off in the "OFF" state, the current setting of the boiler type is shown on the display.
When replacing the display, the settings must always be checked.

Designation of boiler type according to power (KW)					
Boilers for piece wood					
V16	V25	V40	V60	V80	V100
Combined boilers (DPA)					
V12	V18	V26			
Hot air boilers (TVZ)					
V25					

Additional designation	
-	Standard boiler type
L	Lambda Control
DPA	WOOD-PELLETS-AUTOMATIC
DPAL	Not used
DP	WOOD - PELLETS
UD	UD COAL - WOOD
TVZ	Hot air boiler
TVZL	Not used
Change of boiler control system	
AK 2000	Change of control system of the boiler from type AK2000 regulation to type AK4000

λ- Lambda Control. In the case of choosing a boiler with the additional designation **"L"** Lambda Control, the Lambda probe can be disabled by choosing **"no".** The function is used in the event of a Lambda probe malfunction until it is replaced with a new one. At this time, the servo flap uses only two positions: closed and 30% open.

- chimney thermometer. Each boiler is equipped with a chimney temperature measurement as standard. In the event of a malfunction of the thermometer, it can be disabled by selecting **"no".** All functions controlled by the chimney temperature will be blocked. Shutdown of the boiler will be governed by the temperature of the water, not the temperature of the chimney.

 - exhaust fan. Additional boiler accessories. See chapter 6.1. After its assembly and electrical connection to the AK4000 control, it is necessary to select the "yes" option. By choosing **"yes",** the fan can be used in two modes:
1. **Warming up and loading:** The fan works at **100%** power according to the needs of the operator.
2. **Increasing chimney draft:** In the fan operation settings, the speed can be set from **30% to 100%.** The fan works in parallel with the pressure fan. When "OFF" is selected, it is switched off.

 **T** - selection of boiler temperature sensor type.
KTY - standard type **(all VIGAS boilers)**
PT1000 - spare type of thermometer **(HVS)**

 - return temperature setting. Boiler protection against low-temperature corrosion can be ensured by a controlled three-way valve. Only for scheme "14". See MENU. 7.14.

 **MaxT** - setting the maximum boiler temperature limit. The upper limit is used when connecting a boiler with an accumulation tank.

 - pump selection in the short circuit of the boiler. When choosing the "5", "7" Expander hydraulic scheme (MENU 7.14), the protection of the boiler return is ensured by a controlled four-way valve at a temperature of 60^{0}C. In the case of gravitational water flow in a short circuit, the pump can be disabled by selecting **"no".**

 **MinT** - setting the minimum temperature in the storage tank. When choosing a hydraulic scheme with an accumulation tank (MENU 7.14), the boiler will be reheated after the tank has cooled down to the selected temperature.
Attention: The reheating of the boiler will also occur at the moment when there is a demand for heat supply and the storage tank no longer has a sufficient temperature.
Condition of use„  is that the boiler must exceed the set temperature by at least 1.5 ^{0}C and the boiler output will drop to 0%.

 - setting the minimum heat source temperature. It does **NOT apply to VIGAS** boilers. It is used in the case of the additional accessory **EXPANDER AK4000** for an external heat source with temperature measurement.

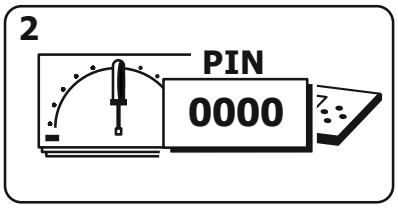
 - outdoor temperature correction setting. If there is an inaccuracy in the measurement of the outdoor temperature sensor due to warming from the building, it is possible to adjust the measured outdoor temperature with a correction.

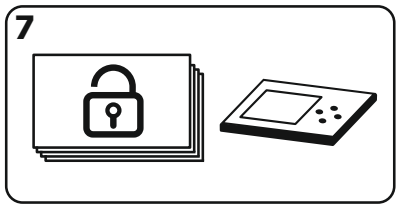
 - voltage frequency setting. For the **EU it is 50Hz.** For the US and Canada it is 60Hz. If you do not know the frequency, select **"AUTO".**
Warning: Incorrect choice of frequency will cause deviation of clock time.

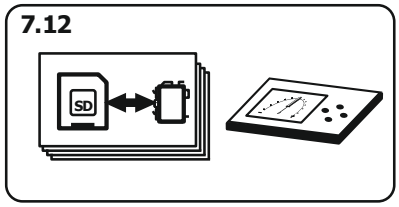
Temper.unit - setting the units for the temperature display. Option to choose **^{0}C** - degrees Celsius or **^{0}F** - degrees Fahrenheit.

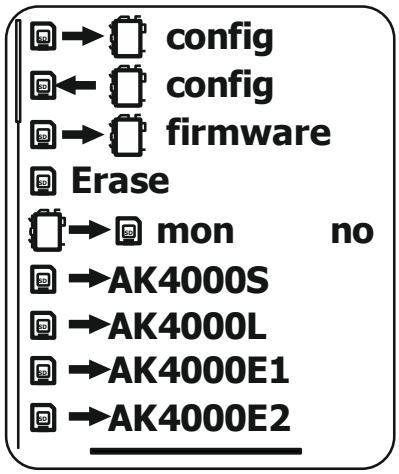
Summer  - setting automatic transition to summer time.

MENU 7.12 SETUP FOR AK4000 M MODULE SETTING UNDER "0000" PASSWORD









In necessary cases, it is possible to connect the AK 4000 M module to the AK4000 regulation.
Using the module, it is possible to update the firmware (control program) or backup the current configuration (boiler type settings of the displayed scheme, settings of individual values, etc.) of the boiler control unit. The AK 4000 M module includes a data line for connection to the power board AK4000 BH BUS and a USB cable for connection to a personal PC.

config - uploading a new configuration (circuit diagram). It is mainly used in systems controlled by EXPANDER AK 4000 E, where it is possible to upload an individual circuit diagram. The configuration file is named: **CfAk4000.bin**.

config - backup of the current configuration. It is used in boiler monitoring.
Execute before starting monitoring! After starting the process, two files are created in the AK 4000 M module directory:
CfAk4000.bck - backup of the current configuration
CfAk4000.bin - current configuration
If necessary, it is possible to return to the original configuration by renaming the **bck** extension to **bin** and use the function **config**.

firmware - uploading the current firmware (boiler control software). The procedure for saving the current firmware **(FwAk4000.bin)** to the AK4000M module and uploading it is given on the website:**www.vimar.sk/podpora/software.sk**
PASSWORD: …….

Erase - erasing all data from the AK4000M module.

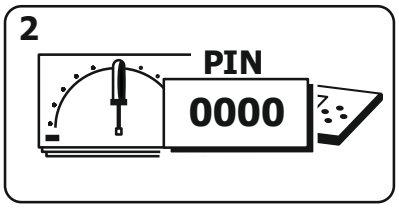
AK4000S - power board software playback. Used only by the manufacturer.

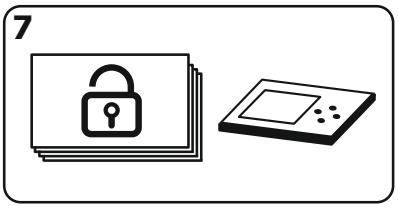
AK4000L - playing the software of the power Lambda board AK4000L. Used only by the manufacturer.

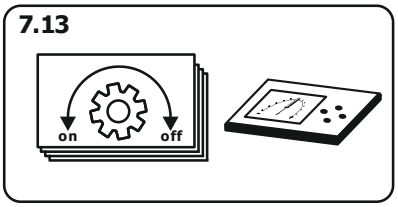
AK4000E1 - playing Expander AK4000**E1** or AK4000**E2** software. Used only by the manufacturer.

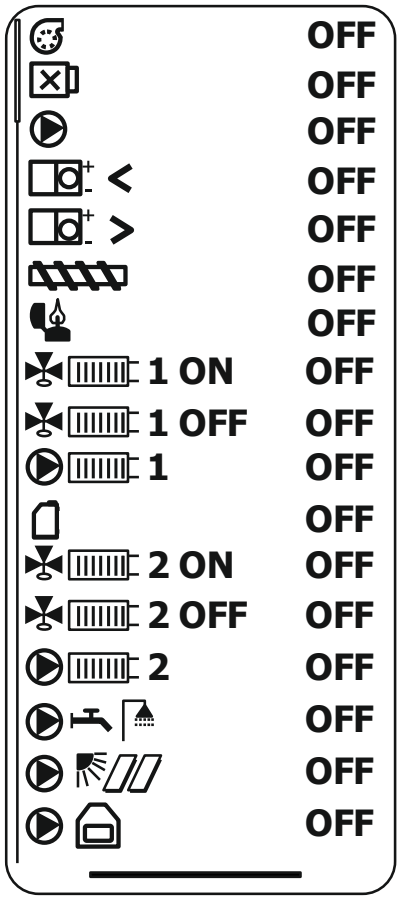
mon - monitoring and writing data from the boiler into the memory of the AK4000M module. It is mainly used for the analysis of boiler work by service technicians. Before starting "yes" monitoring, it is necessary to write the current configuration of the boiler„ **config** „. Data from the boiler will be written every 3 seconds to the file Ak4000.300.

MENU 7.13 MOVEMENT SERVICE CHECK SETTING UNDER "0000" PASSWORD









OFF/ON

In the service settings, you can check the functionality of individual boiler components according to the symbols on the display. After selecting the component and confirming **"ON"**, the component is started. The components shown depend on the boiler configuration.

- pressure fan.

- exhaust fan.

- boiler pump.

- servo valve drive. For VIGAS DPA and VIGAS Lambda Control boilers.

- pellet feeding auger. When **"ON"** is confirmed, the auger works in the period for 100% nominal boiler output. At the same time, this mode makes it possible to check the supplied amount of pellets for a given type of boiler at rated output.
VIGAS 12DPA 2,8kg, 18DPA-4,5kg, 26DPA-5,5kg.
Procedure: We disassemble the burner and replace it, e.g. a paper box into which the pellets will fall.
By confirming **"ON"**, let the auger work for **30 min**. We then weigh the pellets and multiply by **2x**. If the amount of attacked pellets does not correspond to the declared consumption at the rated power, we will adjust the dosage by correcting the power and we repeat the test. Recommended deviation **up to 0.1 kg.**

- pellet ignition spiral for DPA boilers.

1 ON - servo drive DHW1 - **opening.**

1 OFF - servo drive DHW - **closing.**

1 - heating circuit pump.

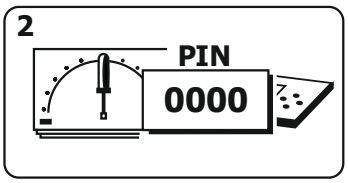
- switching on the relay for the external boiler.

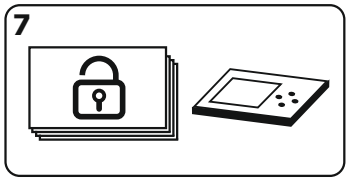
- hot water pump (DHW).

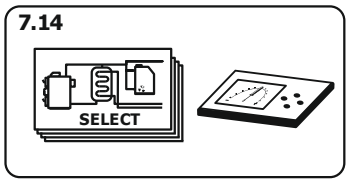
- solar circuit pump.

- hot water fireplace pump.

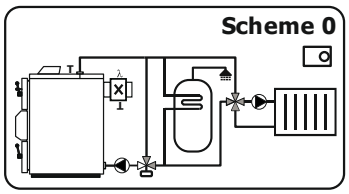
MENU 7.14 SETTING THE HYDRAULIC DIAGRAM OF THE BOILER SETTING UNDER "0000" PASSWORD





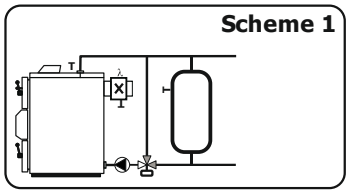


By changing the hydraulic wiring diagram, the control of the pump output, boiler configuration, etc. will change. Therefore, it is important that the software setting of the hydraulic scheme corresponds to the actual connection of the boiler in the central heating system. Basic hydraulic diagrams (diagram 0 to 4) and hydraulic diagrams intended for control with the AK4000 Expander (diagram 5 to 14) are stored in the memory of the **AK4000 control unit**.



SCHEME 0
Control: Basic control AK4000

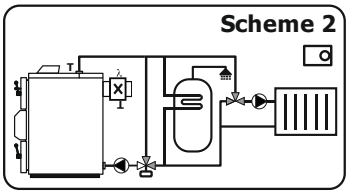
The boiler is protected against low-temperature corrosion by a three-way ESBE thermostatic valve (60^{0}C). A manually controlled four-way mixing valve is used to regulate the water to CH. A combined DHW storage tank is used for DHW heating. Both pumps must be connected to the AK4000S power board together at the "Pump" terminals. A room thermostat can be connected to terminal T3 of the AK4000 power board.



SCHEME 1
Control: Basic control AK4000

Connection with storage tank. To protect the boiler against low-temperature corrosion, a three-way thermostatic valve ESBE (60^{0}C) is used. The pump must be connected to the AK4000S power board at the "Pump" terminals. It is necessary to connect a tank thermometer type KTY code SP 3032 (additional accessory) to terminals T3.

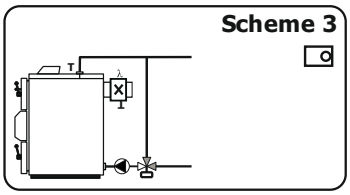
Warning: With scheme 1, it is not possible to connect a room thermostat.



SCHEME 2
Control: Basic control AK4000

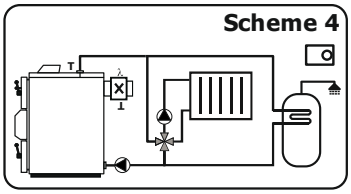
The scheme is identical to scheme "0", only a manually controlled three-way mixing valve is used to regulate the water to CH.

Attention: When connecting with a three-way mixing valve, always connect the combined DHW tank as well.



SCHEME 3
Control: Basic control AK4000

Connection with three-way thermostatic valve ESBE (60^{0}C). The pump must be connected to the AK4000 power board at the "Pump" terminals. A room thermostat can be connected to terminal T3 of the AK4000 power board.



SCHEME 4
Control: Basic control AK4000

Connection with a manually operated four-way valve, which is used to regulate the temperature of the water to UK. It is possible to use a combined DHW storage tank for DHW heating. Both pumps must be connected to the AK4000S power board together at the "Pump" terminals. A room thermostat can be connected to terminal T3 of the AK4000S power board.

Notice:

Connection without a three-way thermostatic valve (ESBE) does not provide sufficient protection against low-temperature corrosion (60^{0}C). From the point of view of prolonging the life of the boiler, it is advisable to use the connection according to scheme **"0".**

Wiring diagrams with EXPANDER AK4000

After confirming the wiring diagram with the Expander (Diagram 5 and above), the service settings are automatically supplemented with options for individual CH and DHW heating circuits. A description of each option is provided below.

1- heating circuit setting

- central heating

- in-floor heating

E 1 - voľba ekvitermickej regulácie

1 - room thermostat selection for circuit 1.

BIN- Binary / **no** - none.

- choice of external boiler. When **"no"** is selected, the external boiler is not displayed on the diagram.

- choice of hot water fireplace. When **"no"** is selected, the fireplace is not displayed on the

2- heating circuit setting

- central heating

- in-floor heating

E 2 - voľba ekvitermickej regulácie pre okruh 2.

2 - room thermostat selection for circuit 2.

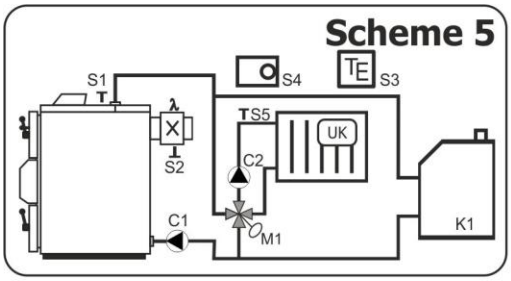
BIN- Binary / **no** - none.

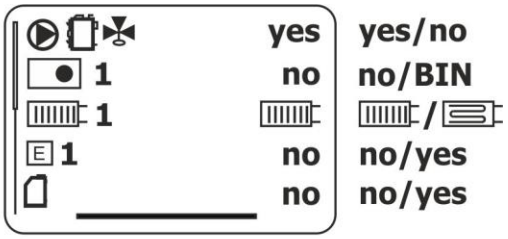
- pump selection in the short circuit of the boiler. The choice applies to schemes 5 and 7. In the case of gravitational water flow in the short circuit, it is possible to disable the pump (C1) from the short circuit by choosing **"no"**. The pump will not be displayed in the diagram.

SCHEME 5

Control: Basic regulation AK4000 + Expander AK4000 basic set (code 5001)

Connection with one CH controlled heating circuit for floor or radiator heating. The CH temperature (S5) can be regulated based on the outside temperature (S3), the room thermostat (S4) or a combination of them. Separately controlled boiler pump (C1) and CH pump (C2). Controlled four-way mixer with servo drive (M1) ensures protection of the boiler against low-temperature corrosion. If the boiler circuit does not reach 60^{0}C, the servo will be closed. The free contacts of the Expander AK4000 can be used to control an external boiler (K1).





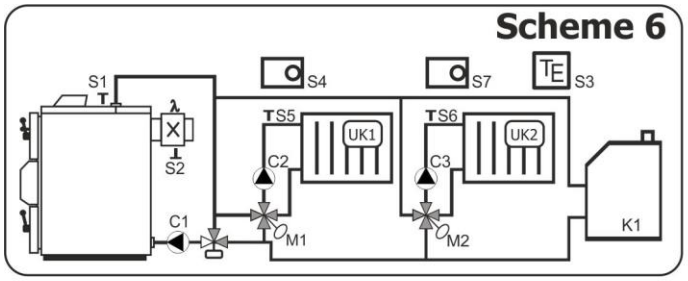
Electrical connection table: Inputs, outputs. Menu 7.15

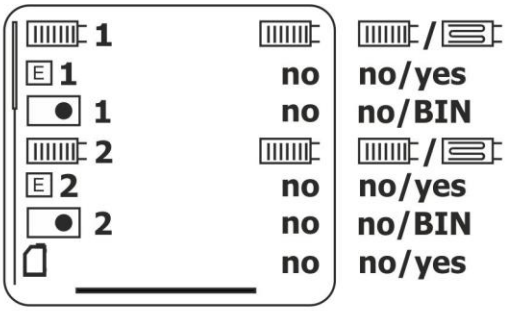
Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs	1	T1	S4	Room thermostat for CH1
		1	T2	S5	Temperature CH1
			T3	S3	Outside temperature
	Outputs	1 ON	R1	M1	Servo CH1 opening
		1 OFF	R2	M1	Servo CH1 closing
		1	R3	C2	Pump CH1
			R4	K1	External boiler (gas, electric)
			R4	K1	External boiler (gas, electric)

SCHEME 6

Control: Basic regulation AK4000 + Expander AK4000 double set (code SP 5002)

Connection with two independently controlled circuits with servo-drive. Possibility to choose floor, radiator heating or their combination. The temperature CH1 (S5) can be regulated based on the outside temperature (S3), room thermostat CH1 (S4) or a combination of them. The temperature CH2 (S6) can be regulated based on the outside temperature (S3), the room thermostat CH1 (S7) or a combination of them. Separately controlled pumps CH1 (C2), CH2 (C3) and boiler pump (C1). The boiler is protected against low-temperature corrosion by a three-way ESBE thermostatic valve (60^{0}C). The free contacts of the Expander AK4000 can be used to control an external boiler (K1).





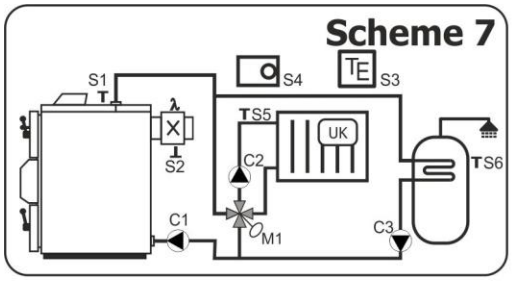
Electrical connection table: Inputs, outputs. Menu 7.15

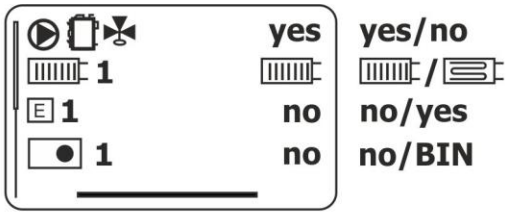
Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs	1	T1	S4	Room thermostat for CH1
		1	T2	S5	Temperature CH1
			T3	S3	Outside temperature
	Outputs	1 ON	R1	M1	Servo CH1 opening
		1 OFF	R2	M1	Servo CH1 closing
		1	R3	C2	Pump CH1
			R4	K1	External boiler (gas, electric)
			R4	K1	External boiler (gas, electric)
AK4000E2	Inputs	2	T1	S7	Room thermostat for CH2
		2	T2	S6	Temperature CH2
	Outputs	2 ON	R1	M2	Servo CH2 opening
		2 OFF	R2	M2	Servo CH2 closing
		2	R3	C3	Pump CH2

SCHEME 7

Control: Basic regulation AK4000 + Expander AK4000 basic set (code SP 5001)

Connection with one CH controlled heating circuit for floor or radiator heating. The CH temperature (S5) can be regulated based on the outside temperature (S3), the room thermostat (S4) or a combination of them. DHW heating controlled by pump (C3) or electric valve - see menu 7.9. Separately controlled boiler pump (C1) and CH pump (C2). Controlled four-way mixer with servo drive (M1) ensures protection of the boiler against low-temperature corrosion. If the boiler circuit does not reach 60^{0}C, the servo will be closed.





Electrical connection table: Inputs, outputs. Menu 7.15

Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs	1	T1	S4	Room thermostat for CH1
		1	T2	S5	Temperature CH1
			T3	S3	Outside temperature
			T4	S6	DHW temperature
	Outputs	1 ON	R1	M1	Servo CH1 opening
		1 OFF	R2	M1	Servo CH1 closing
		1	R3	C2	Pump CH1
			R4	C3	DHW pump
			R4		**Bring the phase from L4 to contact R4**

SCHEME 8

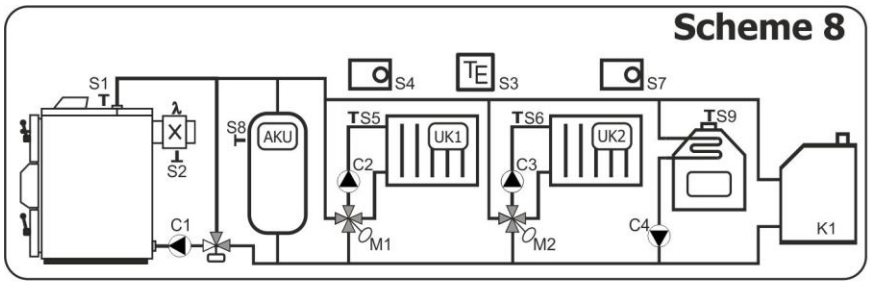
Control: Basic regulation AK4000 + Expander AK4000 double set - (code SP 5002)

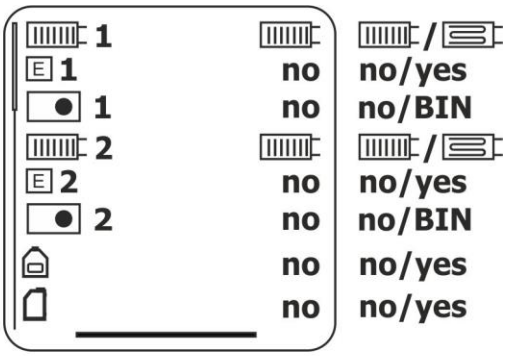
Connection with two separately controlled heating circuits CH1, CH2, ACCU tank and the option of heating with a hot water fireplace (KRB and/or an external boiler (K1). Possibility to choose floor, radiator heating or their combination. The temperature of CH1 (S5) can be regulated based on the outside temperature (S3), the room thermostat (S4) or a combination of them. The CH2 temperature (S6) can be regulated based on the outside temperature (S3), the room thermostat (S7) or a combination of them. The boiler is protected against low-temperature corrosion by a three-way ESBE thermostatic valve (60 ^{0}C).

Notice:

Expander AK4000E double set does not include:

1x thermometer for ACCU tank (S8)-(code SP 3032), 1x thermometer for KRB (S9)-(code SP 3027).





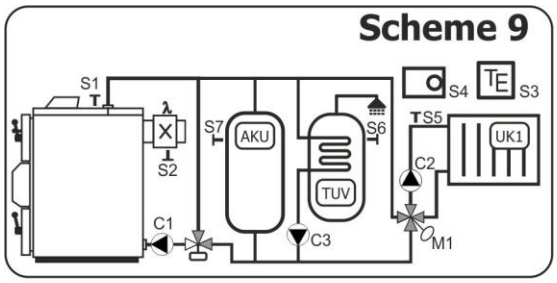
Electrical connection table: Inputs, outputs. Menu 7.15

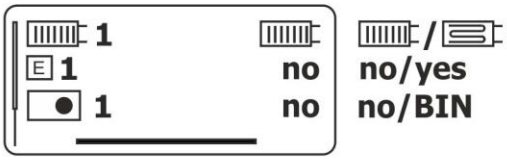
Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs	1	T1	S4	Room thermostat for CH1
		1	T2	S5	Temperature CH1
			T3	S8	ACCU tank temperature
		TE	T4	S3	Outside temperature
	Outputs	1 ON	R1	M1	Servo CH1 opening
		1 OFF	R2	M1	Servo CH1 closing
		1	R3	C2	Pump CH1
			R4	K1	External boiler (gas, electric)
			R4	K1	External boiler (gas, electric)
AK4000E2	Inputs	2	T1	S7	Room thermostat for CH2
		2	T2	S6	Temperature CH2
			T4	S9	KRB temperature (Thermometer type PT1000)
	Outputs	2 ON	R1	M2	Servo CH2 opening
		2 OFF	R2	M2	Servo CH2 closing
		2	R3	C3	Pump CH2
			R4	C4	Hot water fireplace pump
			R4		**Bring the phase from L4 to contact R4**

SCHEME 9

Control: Basic regulation AK4000 + Expander AK4000 basic set (code SP 5001)

Connection with one CH controlled heating circuit with servo drive and storage tank (ACCU). DHW heating controlled by pump (C3) or electric valve, see Menu.7.9. The CH temperature (S5) can be regulated based on the outside temperature (S3), the room thermostat (S4) or a combination of them. The boiler is protected against low-temperature corrosion by a three-way ESBE thermostatic valve (60 ^{0}C).





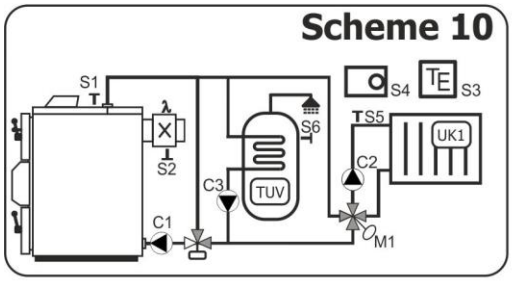
Electrical connection table: Inputs, outputs. Menu 7.15

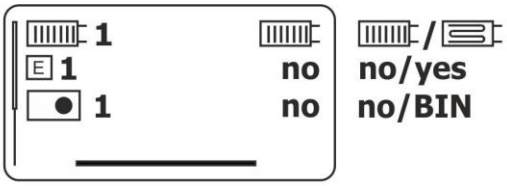
Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
			T3	S7	ACCU tank temperature
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs	1	T1	S4	Room thermostat for CH1
		1	T2	S5	Temperature CH1
		TE	T3	S3	Outside temperature
			T4	S6	DHW temperature
	Outputs	1 ON	R1	M1	Servo CH1 opening
		1 OFF	R2	M1	Servo CH1 closing
		1	R3	C2	Pump CH1
			R4	C3	DHW pump
			R4		**Bring the phase from L4 to contact R4**

SCHEME 10

Control: Basic regulation AK4000 + Expander AK4000 basic set - (code SP 5001)

Connection with one CH controlled heating circuit with servo-drive. DHW heating controlled by pump (C3) or electro-valve, see MENU 7.9. The CH(S5) temperature can be regulated based on the outside temperature (S3), the room thermostat (S4) or a combination of them. The boiler is protected against low-temperature corrosion by a three-way ESBE thermostatic valve (60 ^{0}C).





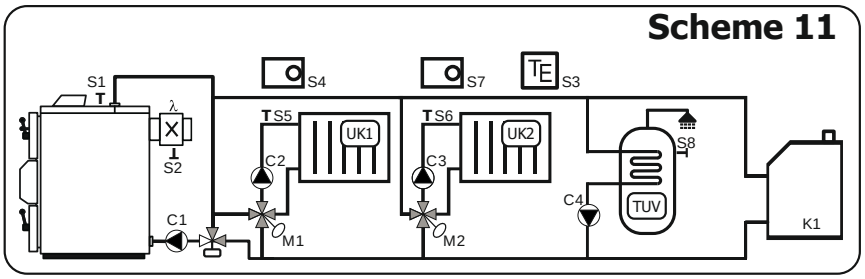
Electrical connection table: Inputs, outputs. Menu 7.15

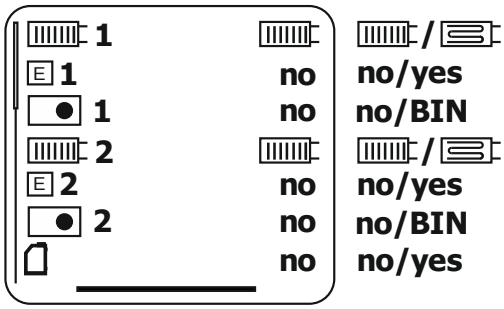
Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs	1	T1	S4	Room thermostat for CH1
		1	T2	S5	Temperature CH1
			T3	S3	Outside temperature
			T4	S6	DHW temperature
	Outputs	1 ON	R1	M1	Servo CH1 opening
		1 OFF	R2	M1	Servo CH1 closing
		1	R3	C2	Pump CH1
			R4	C3	DHW pump
			R4		**Bring the phase from L4 to contact R4**

SCHEME 11

Control: Basic regulation AK4000 + Expander AK4000 double set - (code SP 5002)

Connection with two controlled heating circuits CH1 and CH2 with servo drive. DHW heating is controlled using a pump (C4) or an electric valve, see Menu 7.9. Possibility to choose floor, radiator heating or their combination. The temperature of CH1 (S5) can be regulated based on the outside temperature (S3), the room thermostat (S4) or a combination of them. The CH2 temperature (S6) can be regulated based on the outside temperature (S3), the room thermostat (S7) or a combination of them. The boiler is protected against low-temperature corrosion by a three-way thermostatic valve ESBE (60 ^{0}C).





Electrical connection table: Inputs, outputs. Menu 7.15

Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs	1	T1	S4	Room thermostat for CH1
		1	T2	S5	Temperature CH1
			T3	S3	Outside temperature
	Outputs	1 ON	R1	M1	Servo CH1 opening
		1 OFF	R2	M1	Servo CH1 closing
		1	R3	C2	Pump CH1
			R4	K1	External boiler (gas, electric)
			R4	K1	External boiler (gas, electric)
AK4000E2	Inputs	2	T1	S7	Room thermostat for CH2
		2	T2	S6	Temperature CH2
			T3	S8	DHW temperature
	Outputs	2 ON	R1	M2	Servo CH2 opening
		2 OFF	R2	M2	Servo CH2 closing
		2	R3	C3	Pump CH2
			R4	C4	DHW pump
			R4		**Bring the phase from L4 to contact R4**

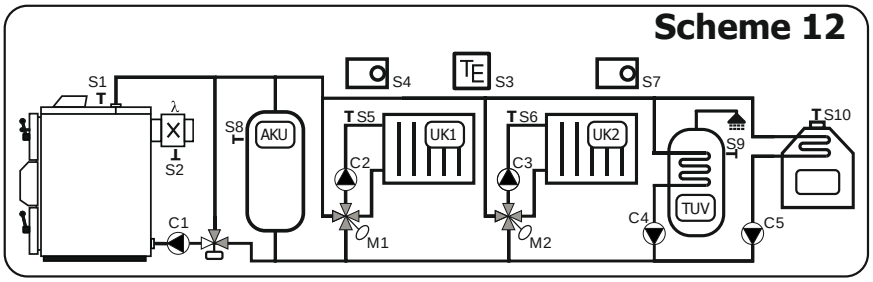
SCHEME 12

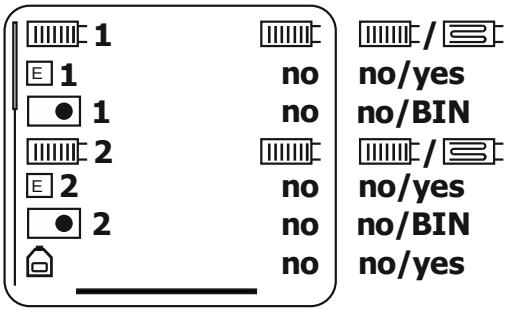
Control: Basic regulation AK4000 + Expander AK4000 double set (code SP 5002)

Connection with two controlled heating circuits CH1 and CH2 with a servo drive and the option of heating with a hot water fireplace. DHW heating controlled by pump (C4) or electric valve, see Menu 7.9. Possibility to choose floor, radiator heating or their combination. The temperature of CH1 (S5) can be regulated based on the outside temperature (S3), the room thermostat (S4) or a combination of them. The CH2 temperature (S6) can be regulated based on the outside temperature (S3), the room thermostat (S7) or a combination of them. The boiler is protected against low-temperature corrosion by a three-way thermostatic valve ESBE (60 ^{0}C).

Notice:

Expander AK4000 double set does not include: 1x thermometer for ACCU reservoir (S8)-(code SP 3032) and 1x thermometer for KRB (S10)-(code SP 3027).





Electrical connection table: Inputs, outputs. Menu 7.15

Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs	1	T1	S4	Room thermostat for CH1
		1	T2	S5	Temperature CH1
			T3	S8	ACCU tank temperature
			T4	S3	Outside temperature
	Outputs	1 ON	R1	M1	Servo CH1 opening
		1 OFF	R2	M1	Servo CH1 closing
		1	R3	C2	Pump CH1
			R4	C4	DHW pump
			R4		**Bring the phase from L4 to contact R4**
AK4000E2	Inputs	2	T1	S7	Room thermostat for CH2
		2	T2	S6	Temperature CH2
			T3	S9	DHW temperature
			T4	S10	KRB temperature (Thermometer type PT1000)
	Outputs	2 ON	R1	M2	Servo CH2 opening
		2 OFF	R2	M2	Servo CH2 closing
		2	R3	C3	Pump CH2
			R4	C5	Hot water fireplace pump
			R4		**Bring the phase from L4 to contact R4**

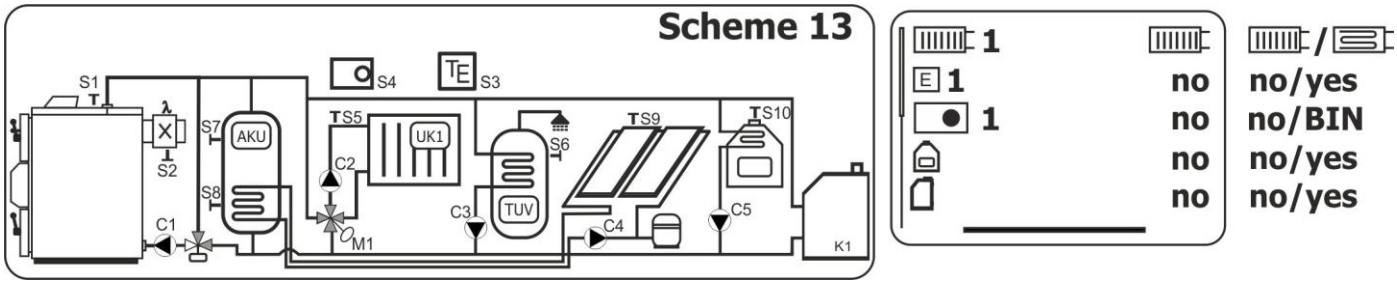
SCHEME 13

Control: Basic regulation AK4000 + Expander AK4000 double set - (code SP 5002)

Connection with one CH controlled heating circuit with servo drive and storage tank (ACCU) and the option of heating with a hot water fireplace, external boiler (K1) or solar panels. DHW heating controlled by pump (C3) or electric valve, see Menu 7.9. The CH temperature (S5) can be regulated based on the outside temperature (S3), the room thermostat (S4) or a combination of them. The boiler is protected against low-temperature corrosion by a three-way thermostatic valve ESBE (60 ^{0}C).

Notice:

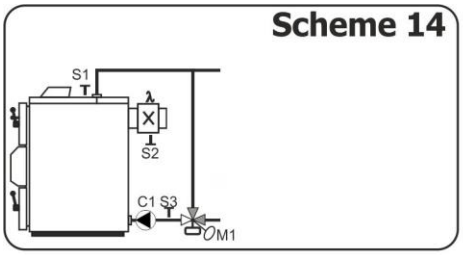
Expander AK4000E double set does not include: 2x thermometer for ACCU tank (S7,S8)-(code SP 3032), 1x thermometer for KRB (S10)-(code SP 3027) and 1x thermometer for SOLAR (S9)-(code SP 3027).



Electrical connection table: Inputs, outputs. Menu 7.15

Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs	1	T1	S4	Room thermostat for CH1
		1	T2	S5	Temperature CH1
			T3	S7	ACCU tank temperature UP
			T4	S8	ACCU tank temperature DOWN
	Outputs	1 ON	R1	M1	Servo CH1 opening
		1 OFF	R2	M1	Servo CH1 closing
		1	R3	C2	Pump CH1
			R4	K1	External boiler (gas, electric)
			R4	K1	External boiler (gas, electric)
AK4000E2	Inputs		T1	S9	Solar circuit temperature
			T2	S6	DHW temperature
			T3	S3	Outside temperature
			T4	S10	KRB temperature (Thermometer type PT1000)
	Outputs		R1	C3	DHW pump
			R2	C4	SOLAR pump
			R4	C5	Hot water fireplace pump
			R4		**Bring the phase from L4 to contact R4**

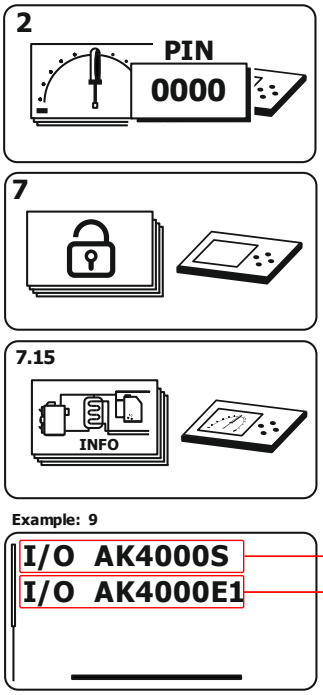
SCHEME 14
Control: Basic regulation AK4000 + Expander AK4000 basic set - (code SP 5001)
Connection with a controlled three-way valve for the set return temperature (S3). Range from 60 to 75 ^{0}C.



Electrical connection table: Inputs, outputs. Menu 7.15

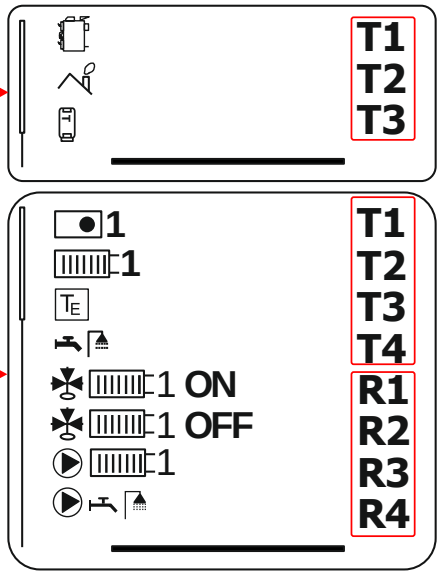
Modul		Symbol	I/O		Description
AK400X Sxxx	Inputs		T1	S1	Boiler temperature
			T2	S2	Flue gas temperature (chimney)
	Outputs		LP	C1	Short circuit pump
			LE		Exhaust fan
AK4000E1	Inputs		T1	S3	Short circuit temperature (return)
	Outputs	ON	R1	M1	SERVO short circuit
		OFF	R2	M1	SERVO short circuit

MENU 7.15 INFO – ELECTRICAL CONNECTION OF INPUTS AND OUTPUTS OF THE CONTROL SYSTEM SETTING UNDER "0000" PASSWORD



For the electrical installation, it is necessary to know the position of the inputs and outputs of the individual sensors (thermometers) and controlled elements (pumps, servo drive, etc.) on the Expander AK4000 module. Depending on the selected hydraulic scheme, the positions of inputs and outputs change and are listed in a separate table for each hydraulic scheme. MENU 7.15 allows the display of inputs and outputs according to the selected scheme for individual modules:

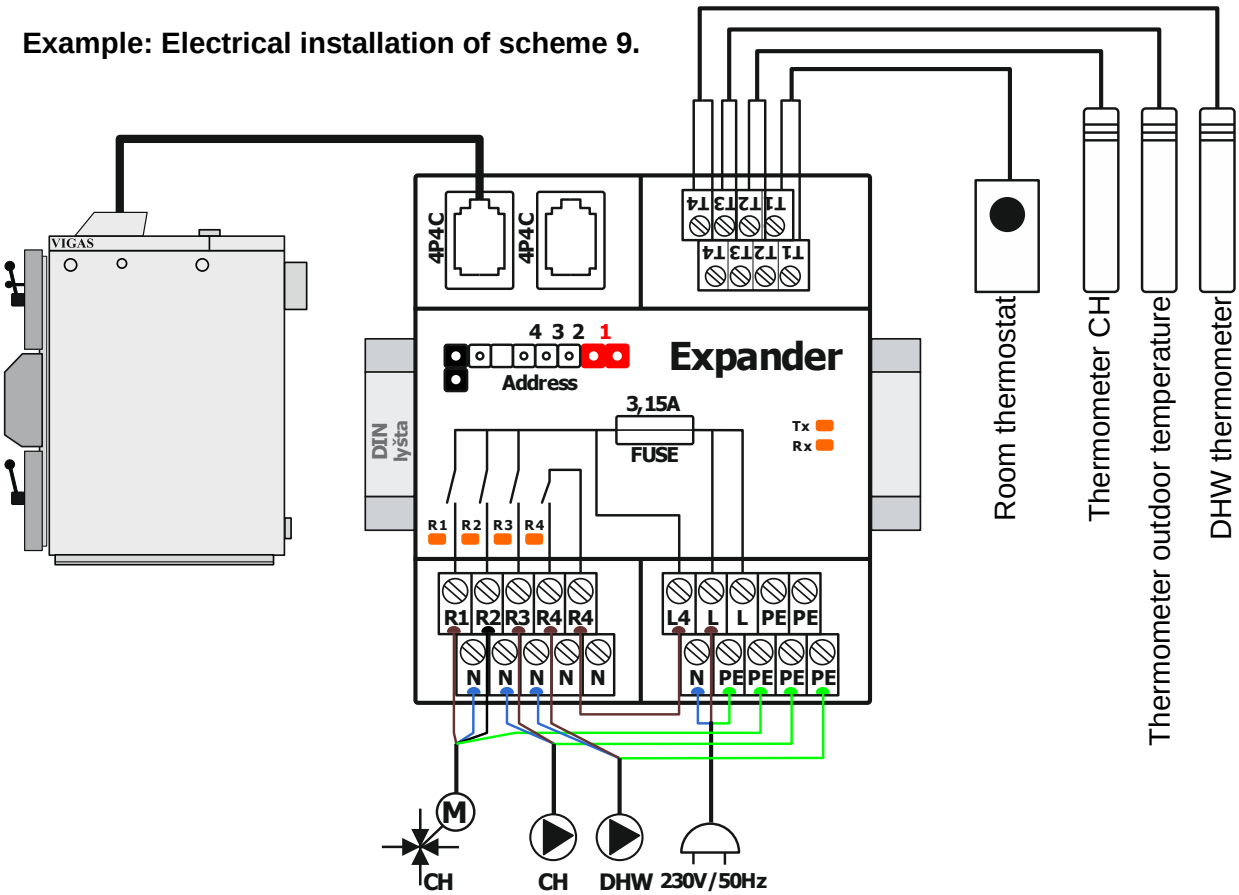
AK4000S - power base plate of the VIGAS boiler
AK4000E1 - Expander E1 module
AK4000E2 - Expander E2 module



Inputs on the power base plate **T1** and **T2** are always connected from the factory. The use of input **T3** depends on the selected hydraulic scheme. It can be used to connect a room thermostat or an ACCU tank thermometer. More wiring diagram in the boiler operating instructions.

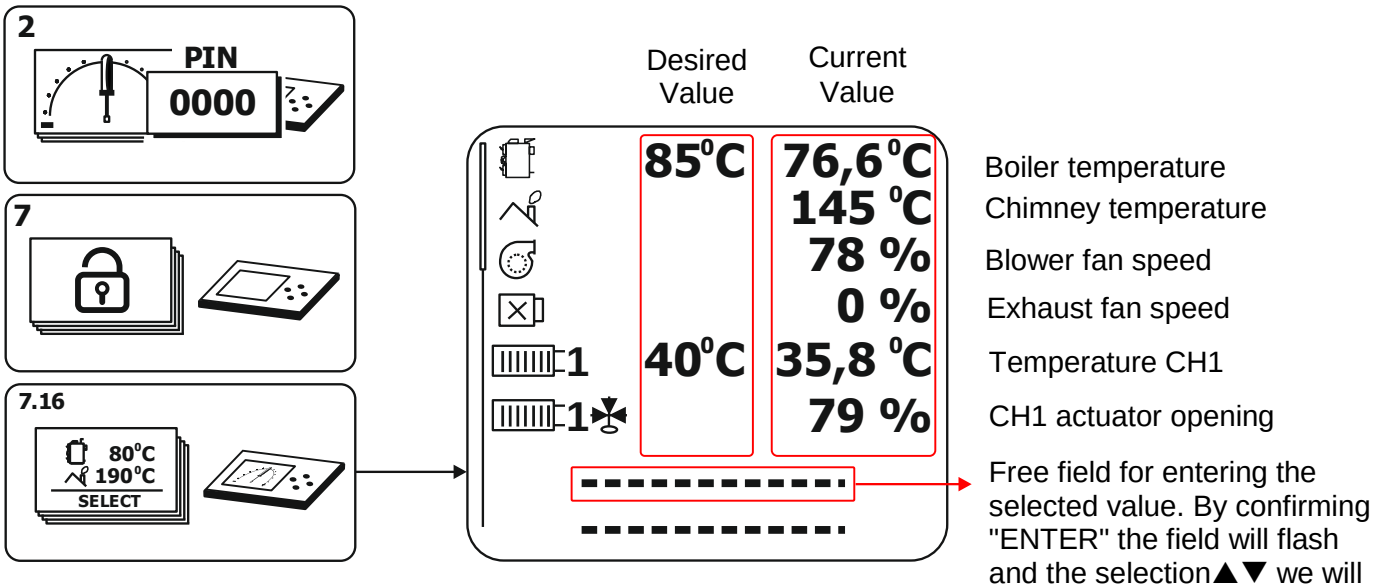
The input positions **(T)** are intended for connecting thermometers and the output positions **(R)** are intended for connecting controlled components (pump, servo drive, etc.) More in the electrical connection table.

Example: Electrical installation of scheme 9.

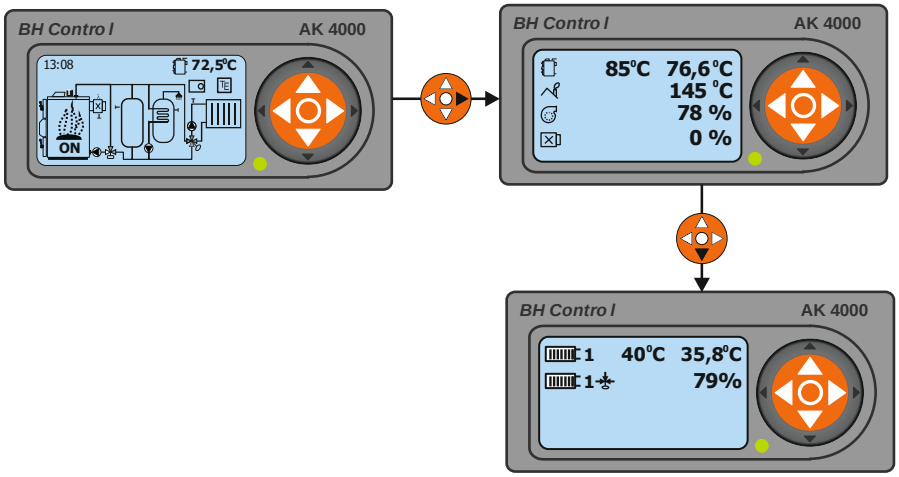


MENU 7.16 LINE DISPLAY OF DATA - SETTING UNDER "0000" PASSWORD

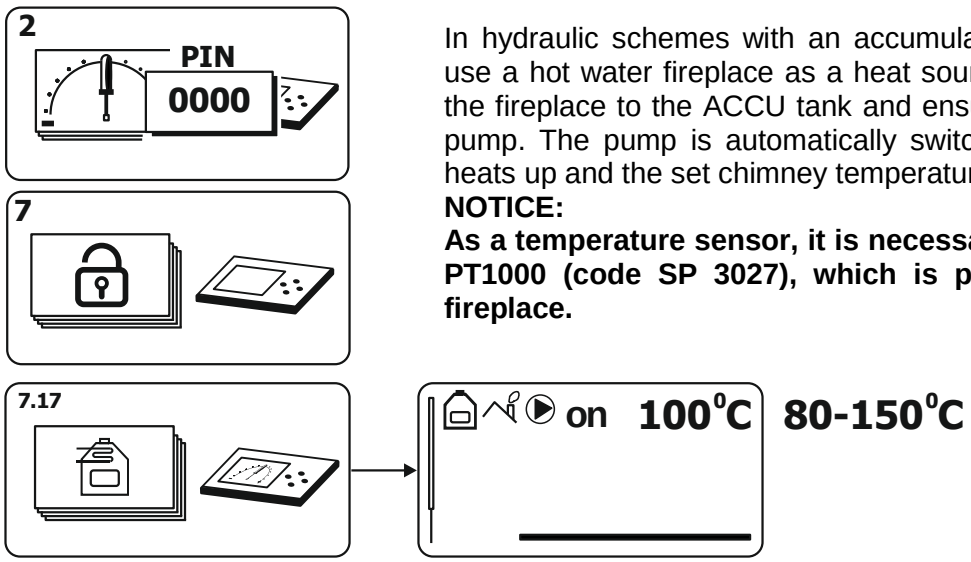
The line display allows you to clearly display the individual data of the AK4000 control system. According to the selected boiler configuration, all available information can be clearly arranged in a line menu.



Example: Line display of values.



MENU 7.17 SETTINGS FOR HOT WATER FIREPLACE SETTING UNDER "0000" PASSWORD



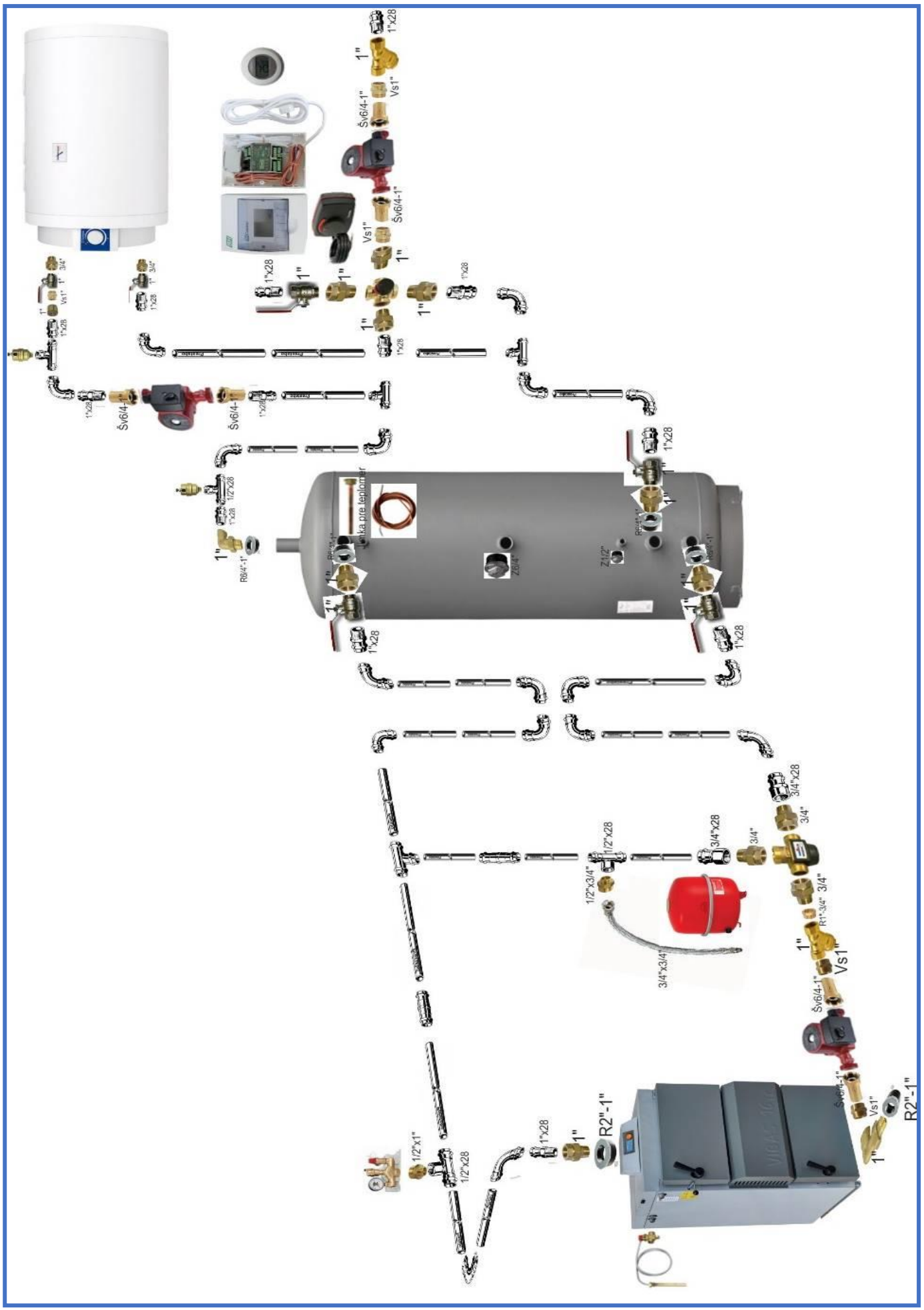
In hydraulic schemes with an accumulation tank, it is also possible to use a hot water fireplace as a heat source. We recommend connecting the fireplace to the ACCU tank and ensuring water flow with a fireplace pump. The pump is automatically switched on whenever the fireplace heats up and the set chimney temperature is reached.

NOTICE:

As a temperature sensor, it is necessary to use a thermometer type PT1000 (code SP 3027), which is placed in the chimney of the fireplace.

Example: Hydraulic installation Scheme 7.

Example: Hydraulic installation Scheme 9.



Notes:

BH Control

VIGAS

Gasifying boilers

Producer:
Pavel Vigaš - VIMAR
M. Čulena 25
974 11 Banská Bystrica
SLOVAKIA

Production plant:
Pavel Vigaš - VIMAR
Príboj 796
976 13 Slovenská Ľupča
SLOVAKIA
tel.: 00421 48 4187 022
fax: 00421 48 4187 159

WWW.VIMAR.SK WWW.VIGAS.EU
vimar@vimar.sk

2.11.2023 23:57