

Manual for installation, operation and maintenance of boiler

THERM 49 KD

THERM 65 KD

Hanging gas condensing boiler



Thermona[®]



**Manual for installation,
service and maintenance
of boiler**

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1. GENERAL INFORMATION

1.1 Use

The THERM 49 KD and 65 KD hanging gas condensing boilers are modern hot-water gas appliances suitable for heating buildings with a heat loss below 49 or 65 kW when used independently, or for larger buildings with a higher heat loss when used in a cascade. The required boiler room output can be obtained by arranging boilers into a cascade controlled by its own regulation. This way, you can obtain a heat source with high efficiency, smart operation and high reliability with a simple installation. The individual boiler units are constructed as consumer appliances using condensed water steam in the combustion process with excellent efficiency, minimum emissions into the air and the minimum consumption of electricity. It means that their operation is economical and does not strain the environment. The output of the boiler is continuously regulated within the scope of 14–100% and it automatically adjusts to the needs of the building.

! The minimum water pressure in the heating system must be maintained at 0.8 bar (measured in cold condition) to ensure the proper function of the boiler. The THERM 49 KD and 65 KD boilers are not equipped with an expansion vessel with regard to their output and variability of use. If the boiler is connected to a system with an open expansion tank, it has to be installed at least 8 metres above the boiler.

1.2 Equipment Details

1.2.1 Equipment description

- hanging gas condensing boiler designed for hot-water heating
- option to heat water – heating in an external indirect heating storage tank
- natural gas operation
- option to create cascades of boilers
- fully automated operation
- low consumption of electricity
- automatic fluent output modulation
- simple boiler control
- high comfort level
- built-in equithermal regulation
- ability to control by the superior indoor thermostat or intelligent indoor control unit
- high level of operational safety
- security elements of the boiler prevent the boiler from overheating and gas escapes
- built-in energy saving circulation pump
- safety valve 3 bar
- protective functions (anti-freeze protection, pump protection, etc.)
- electric ignition (saving of fuel)
- closed combustion chamber – TURBO variant
- air for combustion is sucked in from the open air

1.2.2 General description

The basis element of the THERM 49 KD and 65 KD gas condensing boiler is the load-bearing frame in which individual elements are mounted. The upper part of the boiler contains a compact, stainless condensing body that connects the combustion chamber with the burner and the stainless exchanger. The coating of the condensing boiler consists of an external therm-plastic shell, which is reinforced by an internal stainless wall which significantly restricts the passage of heat into the surroundings. The heat transfer surfaces of the exchangers consist of oval tubes that must be protected from getting clogged by impurities from the heating system. Therefore, it is required to install a filter with a sludge trap on the return water inlet line. The collector on the output for the heating water from the body is fitted with a de-aerating valve. The removable front burner face of the element is equipped with a multifunctional electrode, a flash pipe, and shaped pipeline for the inlet of the gas and air mixture.

The suitable mix of fuel for burning is prepared by mutual action of the fan, mixer, electrically modulated gas valve and controlling automatics of the boiler. Together, these components create a compact and active control system of the combustion process. Using a compound electrode of the burner wall of the condensation body, the electronics receives feedback information about the status of burning and optimizes the program map so that the combustion process is continuously optimal.

Condensate is created during the operation of the condensation boiler. The outflow of condensate from the condensation body, exhaust piping for burnt gases and the supply of air are directed by hoses into the odour closure if the condensate flows outside the boiler. To ensure the flow of water through the boiler, the return water inlet is equipped with a Wilo energy-saving pump with electronically controlled speed. The circulating pump is integrated in a compact hydro-block, which also includes a de-aerating valve, a valve for draining heating water from the boiler, a pressure sensor, a safety valve, etc.

The supply of combustion air, including the forced exhaust of burnt gases is, as a rule, ensured by coaxial piping which runs horizontally through the peripheral wall or vertically through the roof construction into the open air. It is necessary to install the piping to prevent (due to the low temperatures of burnt gases) the possibility of the freezing of the exhaust terminal. Vertical piping must terminate at the roof chimney, horizontal with a slight slope into the exhaust from the boiler.

On the front side of the boiler there are control elements and display (see "User Manual" chapter). The control panel includes control microprocessor automatics for controlling the activities of the boiler, combustion, boiler safety and regulation.

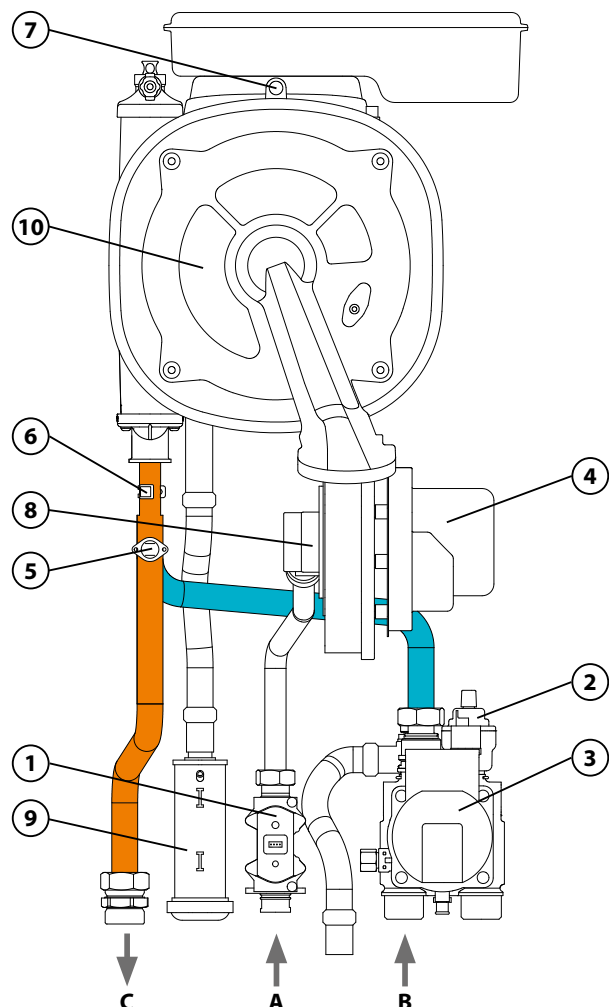
The boiler may also be expanded with a suitable motorised three-way valve to divide the functions of heating hot water and the heating system.

1.2.3 Simplified hydraulic diagram and functional diagram (is not source material for assembly)


THERM 49 KD, 65 KD

- 1 - Gas valve
- 2 - De-aerating valve*
- 3 - Circulation pump
- 4 - Ventilator
- 5 - Emergency thermostat
- 6 - Heating temperature probe
- 7 - Flue gas temperature probe
- 8 - Mixer
- 9 - Gulley trap (siphon)
- 10 - Condensing body

- A - Input for gas
- B - Input for returned water
- C - Output for heating water



1.3 Operational safety

 **THERM boilers are fitted with all safety, emergency and protective elements to ensure completely safe boiler operation. If irrespective of this, e.g. due to unprofessional intervention, irregular inspections and revisions of the boiler, etc., there is a non-standard status then we recommend proceeding as follows:**

In the case of gas odour

- close the gas valve under the boiler
- ensure ventilation of the room (windows, door)
- do not manipulate the electric switch
- liquidate any naked flame
- immediately call service (the boiler must not be used until after the service inspection)

In the case of an odour of combustion burnt gases

- disconnect the boiler
- ensure ventilation of the room (windows, door)
- call service (the boiler must not be used until after the service inspection)

In the case of a consumer appliance fire

- close the gas valve under the consumer appliance
- disconnect the consumer appliance from the electricity network
- liquidate the fire with powder extinguishing equipment or a foam extinguisher

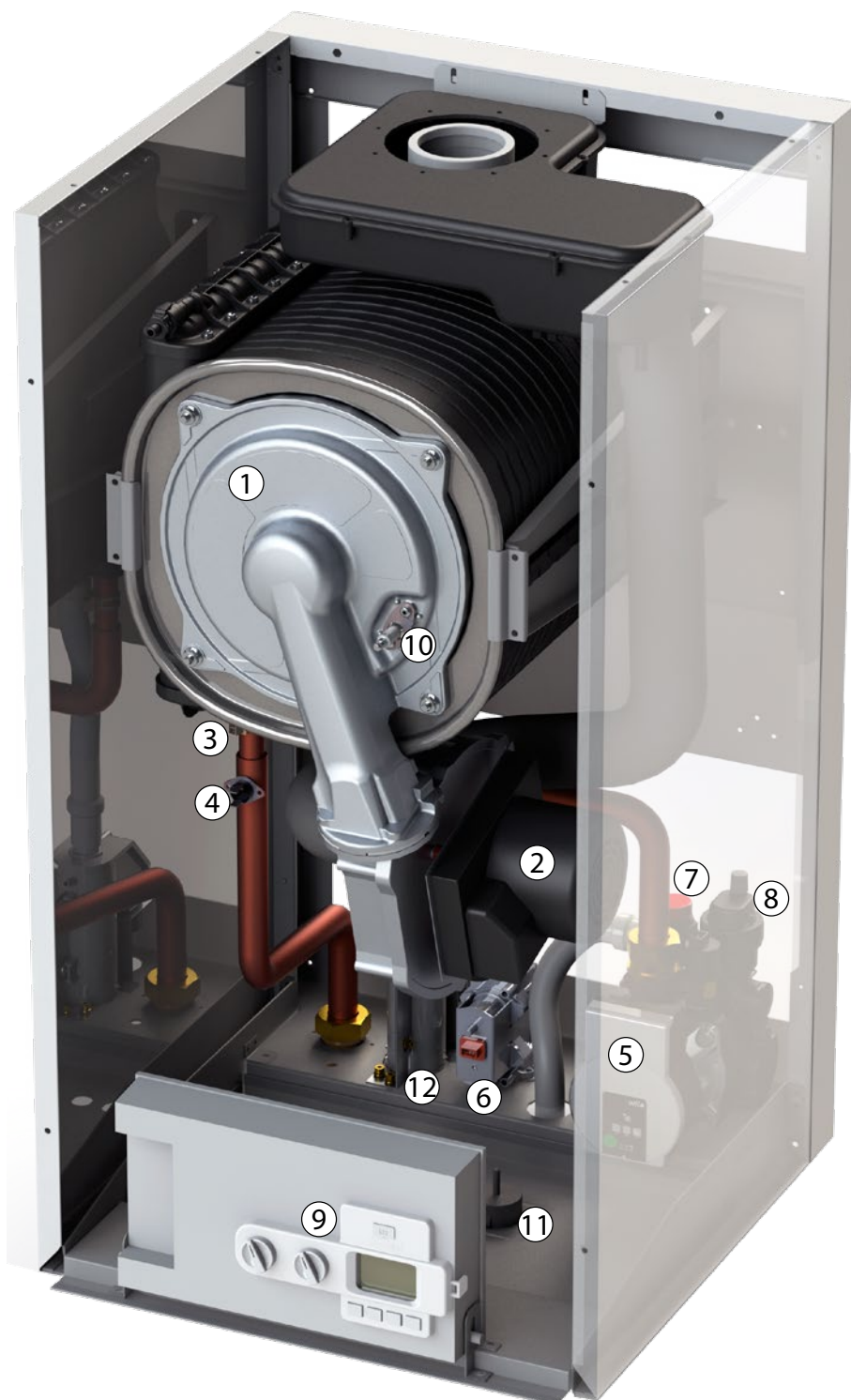
1.4 Technical parameters

Technical description	Unit	THERM 49 KD	THERM 65 KD	
Fuel	-	natural gas	natural gas	
Construction	-	$C_{13}, C_{33}, C_{43}, C_{53}, C_{83}, C_{93}$	$C_{13}, C_{33}, C_{43}, C_{53}, C_{83}, C_{93}$	
Consumer appliance category	-	I_{2H}, I_{2E}	I_{2H}, I_{2E}	
Nominal thermal input for heating Q_n	kW	47.0	65.0	
Minimal thermal input for heating Q_n	kW	6.5	8.0	
Nominal thermal output for heating P_n	$\Delta t = 80/60\text{ }^\circ\text{C}$	45.5	63.0	
	$\Delta t = 50/30\text{ }^\circ\text{C}$	49.5	68.5	
Minimal thermal output P_n	$\Delta t = 50/30\text{ }^\circ\text{C}$	7.4	8.4	
	$\Delta t = 80/60\text{ }^\circ\text{C}$	6.2	7.3	
Drilling gas curtains	mm	7.1	11.5	
Gas overpressure on the consumer appliance input	mbar	20	20	
Consumption of gas	$\text{m}^3 \cdot \text{h}^{-1}$	0.6–4.7	0.8–6.3	
Maximum overpressure of heating system PMS	bar	3.0	3.0	
Minimum overpressure of heating system	bar	0.8	0.8	
Max. output temperature of heating water	$^\circ\text{C}$	80	80	
Flue-gas installation alternatives	mm	80/125, 2x 80	80/125, 2x 80	
Average temperature of burnt gases	$^\circ\text{C}$	48	44	
Flue gas temperature in case of overheating	$^\circ\text{C}$	86	88	
Lowest flue gas temperature at min. heating output	$^\circ\text{C}$	34	32	
Weight flow of burnt gases	$\text{g} \cdot \text{s}^{-1}$	3.1–23.1	3.5–33.2	
Acoustic performance level	dB (A)	54	54	
Boiler efficiency	%	98–107	98–106	
NOx class of boiler	-	6	6	
Type of electricity supply	-	~	~	
Nominal supply voltage / frequency	V / Hz	230 / 50	230 / 50	
Nominal current of the circuit breaker for consumer appliance	A	2	2	
Auxiliary electricity at	nominal heat input power	W	86.0	74.5
	partial loading	W	18.0	24.2
	emergency status	W	4.0	4.5
Degree of protection of electrical parts	-	IP x1D	IP x1D	
Environment according to CSN 33 20 00 – 3	-	basic AA5 / AB5	basic AA5 / AB5	
Dimensions of boiler: height / width / depth	mm	800 / 430 / 395	800 / 430 / 455	
Weight of boiler	kg	39	42	

1.5 Set of boiler

THERM 49 KD, 65 KD

- 1 - Condensing chamber
- 2 - Ventilator
- 3 - Heating temperature probe
- 4 - Emergency thermostat
- 5 - Circulation pump
- 6 - Gas valve
- 7 - Safety valve
- 8 - De-aerating valve*
- 9 - Control panel
- 10 - Compound ignition and ionising electrode
- 11 - Pressure gauge
- 12 - Gulley trap (siphon)



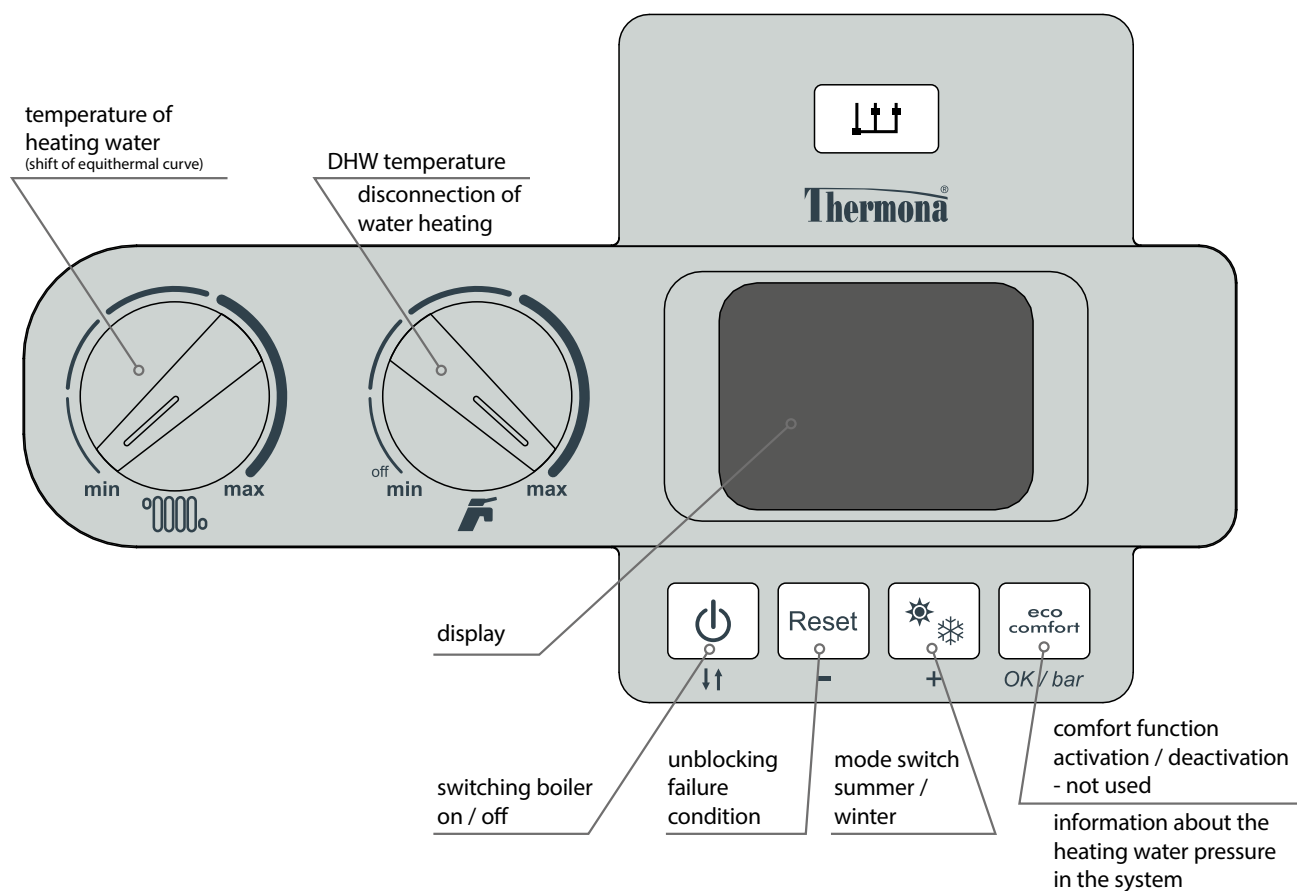
2. USER MANUAL

2.1 Control and signalling


This appliance may be used by children at the age of 8 and above and by people with impaired physical, sensory or mental abilities, or lack of experience and knowledge provided that they are supervised or that they have been instructed on the safe use of the appliance, and that they understand the potential risks. Children must not play with the appliance. Children must not perform cleaning and maintenance of the appliance without supervision.


2.1.1 Boiler control panel


The controls of the boiler are located in the bottom part of the front cover of the boiler.




Controls function

 **Switching boiler on / off** – when off, the protective functions of the boiler remain active (when the boiler is connected to the power supply and the gas inlet is open). If selecting this mode, the boiler display only indicates the pressure in the heating system, the heating is disconnected, there is heating of TUV and, at the same time, the backlit display is --. After activation, the boiler display shows information about the type of the burned gas (N – natural gas) and output (type) of the boiler in kW. Then, the display is tested; all the available symbols are displayed. After the test, it is possible to choose the winter or summer mode of the boiler.

 **Reset** – unblocking the failure status of the boiler

 **Winter / summer regime**
 Winter regime (heating and heating of DHW is ON)
 Summer regime (only heating of DHW is ON, the heating is OFF)

 **Activation / deactivation of the Comfort function** – not used.

 **Information about heating water pressure** – hold the button for 1 second to display the current heating water pressure (5 seconds)

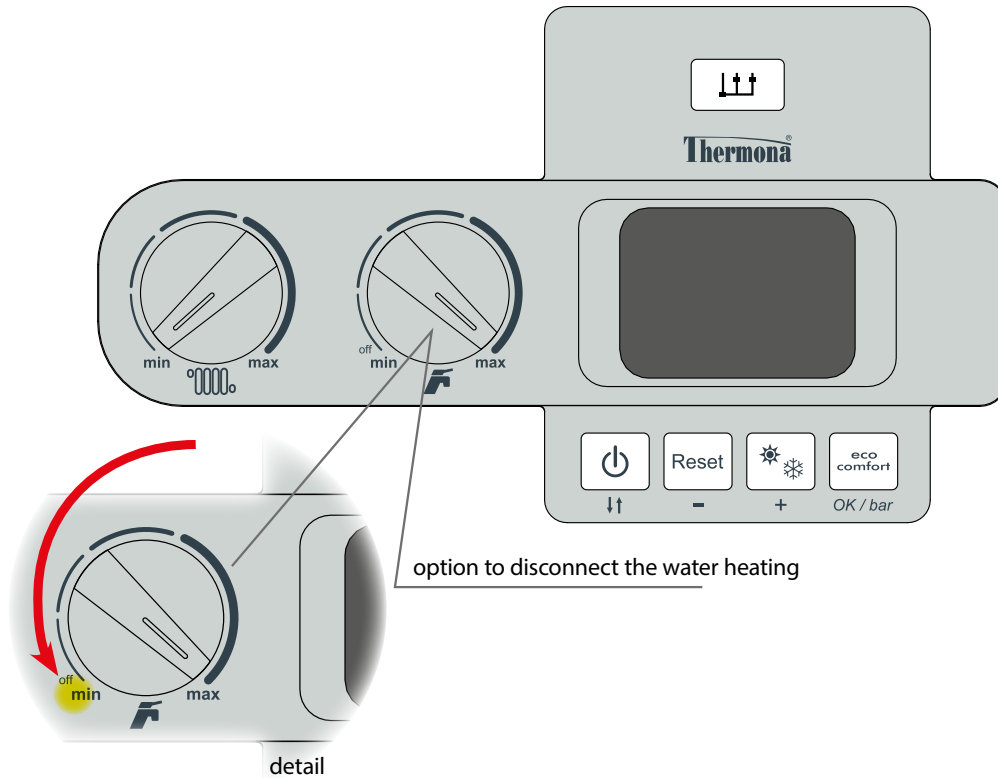


Setting the heating temperature – rotary control knob for user setting of the output temperature of water in the heating system within the range 30–80°C. In the case of selected equithermal regulation, the shift in the heating curve is set by the control knob (within the range $\pm 15^\circ\text{C}$ from the equithermal curve)



Setting the temperature of DHW – rotary knob for user setting of the requested temperature of hot water within the range 35 - 60 °C (the recommended setting is 60 °C). Used when hot-water temperature is read by an NTC sensor in an external tank.

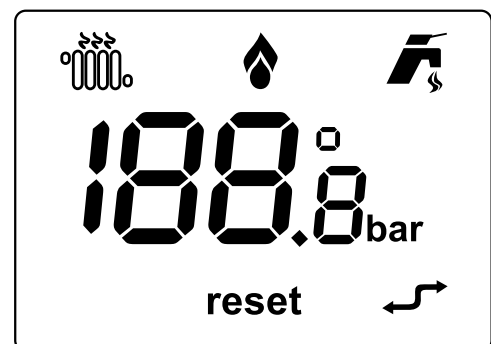
Disconnection of water heating – setting the rotary control knob for user setting of the output temperature of the hot water to the left side position (less than 10° of the route); the heating of water can be permanently disconnected from operation.








2.1.2 LCD display

Indication of set temperature

After turning the control knob for setting the temperature of the heating system or DHW (boilers with flow heating of DHW) the respective symbol of the regime will start to flash along with the numeric display of the temperature on the LCD display. In this case, the value of the last temperature set is indicated. After the termination of the setting, the indication of the set temperature remains for about 5 seconds. The following permanent display of the numeric value and the symbol, the real temperature of the respective regime is indicated again.



Description of symbols shown on the display

SYMBOL	MEANING
	Display of temperatures, failure statuses and service values
	Permanent light – the boiler is in the summer or winter mode Flashing – water is being heated, or the required water temperature needs to be set
	Permanent light – boiler is in winter mode Flashing – heating mode is active, or the required heating temperature needs to be set
	Permanent light – flame detection – the burner is working
reset	Permanent light – detected boiler failure
	Permanent light - Opentherm+ communication is active
bar	Displayed together with the current value of the water pressure in the heating system

2.1.3 Custom menu

There are three sub menus available within the user menu:

Information menu "In" (SW version, temperature, pressure etc.)

Statistical menu "Co" (operating data counters)

Failure register "Al".

User menu activation

To enter the user menu (and also the information sub menu), press and hold the Reset button for 5 – 10 seconds. The display shows alternating "In" (1 sec), "00" (1 sec) indicating the order of the parameter and the value of the parameter (5 sec). The information sub menu is always displayed first when the user menu is accessed.

Browsing the menu

Browsing the menu is possible by briefly pressing the On / Off button. The browsing method in the menu is cyclical. When the last item is accessed and the On / Off button pressed again, the menu goes back to the first item.

Switching between subgenus

Press the Reset button shortly. Keep pressing to browse through the individual subgenus (In - Co - Al).

Closing the user menu

The same as opening the user menu – hold the Reset button for 5 – 10 seconds.

List of displayed parameters

Order	Description	Unit
Information menu „In“		
In0	SW automatics version	
In1	Outside temperature	°C
In2	Temperature of heating water	°C
In3	Flue gas temperature	°C
In4	DHW temperature	°C
In5	Temperature of return water	°C
In6	The required heating temperature	°C
In7	Boiler output	%
In8	Inactivated	-
In9	Pressure of heating water	bar
In10	Fan speed	rpm x 100

Statistic menu „Co“		
Co0 *	Time of boiler connection to the power supply	h x 100
Co1 *	Time of burner operation	h x 100
Co2 *	Number of burner ignitions	x 1000
Co3	Total number of detected boiler failures	
Co4	Number of service menu entries	
Co5	Number of OEM menu entries	
Co6	Inactivated	-

* If the displayed value flashes quickly, it is a decimal number.
E.g., the flashing value of 20 = 2.0 * 100 (or *1000)

Failure register „AI“.		
AI0	Displaying the last detected failure	-
AI1 - AI9	Displaying previous failures	-

2.1.4 Error messages

Any potential failure or other anomaly is indicated by alternating flashing of the failure code with the text E or rE and illumination of the LCD display.

Error code displayed on LCD and the meaning:

ERROR CODE	MEANING
E 02	Low pressure of heating water
E 03	High pressure of heating water
E 04	Defect to the thermal DHW probe - KDC version
E 05	Defect to the thermal heating probe
rE 06	Blocking of the activity when the burner is not ignited
rE 07	Blocking of activity after overheating of the boiler (emergency thermostat)
rE 08	Indication of false flame
E 09	Low flow of heating water
E 10	Defect to the outside temperature sensor
E 11	Disconnected or damaged gas valve modulator
E 12	Defect to the thermal DHW probe - KDZ version
E 13	High temperature of burnt gases
E 14	Defect of the thermal probe of burnt gases
E 15	Fan control failure
E 16	Defect of the thermal probe of return water
rE 28	Recurring system blocking
E 37	Low voltage in the network
E 40	Network frequency outside the range
rE 41	Recurring loss of flame (more than 6 trials)
E 42	Control panel button defect
E 43	OpenTherm communication error
rE 44	Gas valve defect
E 62	Boiler calibration required
rE 72	Unspecified failure
E 77	Optimal combustion cannot be achieved
E 78	Optimal combustion cannot be achieved, low fan displacement
E 79	Optimal combustion cannot be achieved
E 84	Low input gas pressure
rE 88	Gas valve control defect
E 89	Ionisation reading error
E 90	Combustion failure
E 93	Combustion failure
E 94	Combustion failure
E 95	Short-term ionisation loss
E 96	Blocked exhaust for burnt gases or air suction
rE 98	Controlling automatics SW error
rE 99	Common error

rE - The boiler is blocked. To reactivate the boiler, manually reset of boiler.

The error code is saved into the memory of the processor where it is also saved in the case of a supply failure.

2.2 Activation and deactivation of the boiler

2.2.1 Commissioning of the boiler

! The boiler must only be commissioned by a service employee authorised by the producer! The list of service technicians is attached to the product.

Action to be taken before and during the activation of the boiler.

Before the first activation of the boiler it is necessary to take the following measures:

- check that the heating system is filled with water and the boiler is correctly de-aerated
- ensure that all valves under the boiler and in the heating system are open
- check that the sludge trap with a magnet is installed
- open the gas valve and, using the gas escape detector or foam-making solution, test the tightness of the gas distribution in the boiler

! If the boiler exchange is not de-aerated, irreversible damage to the boiler may occur!

The procedure for the first ignition of the boiler is as follows:

- set the rotary button of the input temperature of the heating water of the boiler to the maximum
- insert the network supply into the socket and switch on the boiler with the switch for operating regimes
- using the gas escape detector or foam-making solution, test the tightness of the gas distribution in the boiler
- inspect the correct activity of all thermostats and control elements
- inspect all functions of the boiler
- adjust the burning of the machine or modify the setting according to demands of the area to be heated
- train the user

! The setting of output range of the boiler and other parameters must be in accordance with the technical data. Any overloading and incorrect use of the boiler may cause the devaluation of its components. The warranty cannot be applied for such damaged components!

The boiler must not be operated with the emergency or flue thermostat or another safety component put out of operation or replaced by other equipment than that stated by the producer! Otherwise, an accident or other hazardous statuses may occur!

A service technician authorised by the producer must familiarize the user during activation with the operation of the boiler, the individual parts, the safety elements and the manner of control, complete the Warranty Certificate and give this user manual to the user.

The user is obliged to ensure of the correct use of the boiler in accordance with this manual which is a conditions of acceptance of the warranty. In addition, it is strictly forbidden to intervene in any manner into the secured parts in the boiler!

2.2.2 Disconnection of the boiler from operation

The boiler can be switched off for a shorter period of time by a button on the control panel, or the switch on the room thermostat.

For longer disconnection of the boiler outside the heating season (e.g. during summer and holidays) it is recommended to close the gas valve. However, leave the boiler connected to the electricity network. Only in this case will the protective functions of the boiler be active.

Any full disconnection of the boiler (closing of gas supply, disconnection from electricity network) must be done with respect to the ambient temperature of the environment in the respective season! There is a risk of the heating system or DHW circuit freezing due to damage to the boiler or other elements of the heating system.

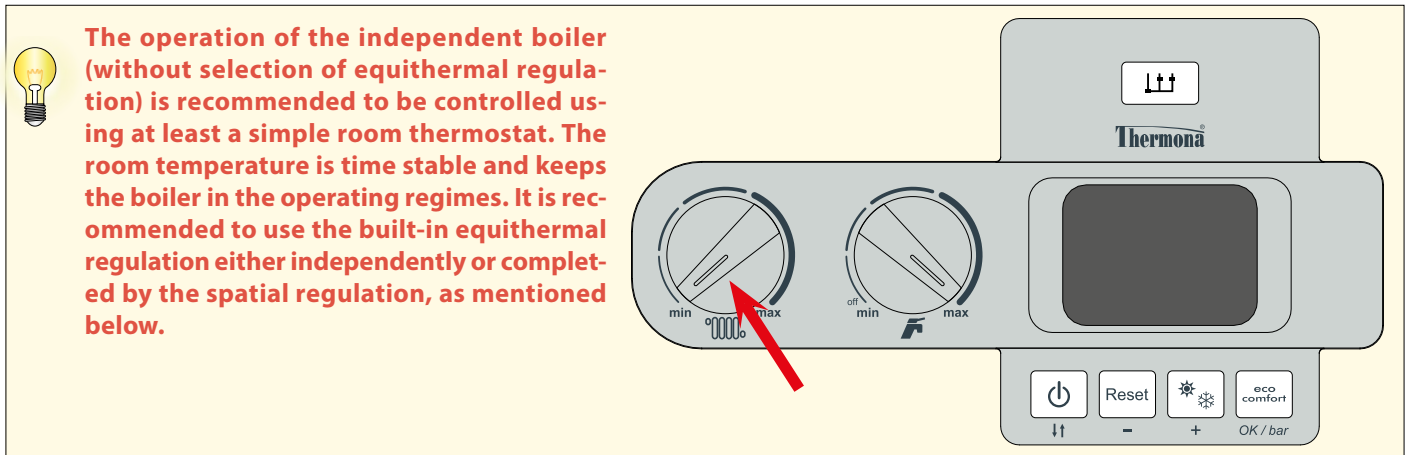
2.3 Regulation

The boiler has several regulation options in the basic equipment. The standard is integrated equithermal regulation. The heating in the heating system can be controlled in several ways: regulation of the room temperature in a selected reference room; equithermal regulation of heating water, regulation according to the boiler temperature etc.

2.3.1 Operation of the boiler without the room thermostat or regulator

In this regime the boiler maintains the selected temperature of the heating water. The room thermostat or the regulator is not connected; the terminals for connection must be mutually interconnected (set in production).

In this regime, set the temperature of the heating water directly on the control panel of the boiler with the middle button.



The operation of the independent boiler (without selection of equithermal regulation) is recommended to be controlled using at least a simple room thermostat. The room temperature is time stable and keeps the boiler in the operating regimes. It is recommended to use the built-in equithermal regulation either independently or completed by the spatial regulation, as mentioned below.

2.3.2 Operation of the boiler with spatial thermostat

In this manner of regulation, the boiler maintains the selected temperature of heating water. The room thermostat is connected instead of the terminal block jumper on the boiler control panel. The operation of the boiler is consequently controlled according to the inside temperature in a room where the room thermostat is located (the reference room). It is not recommended to mount thermostatic valves on radiators in the reference room!

Thermona supplies and recommends a series of room thermostats for boilers controlled by room temperature: such as THERM Home S, THERM Home SR (wireless version), BT52 Wi-Fi etc.

The mentioned ad-in regulators are not (with the exception of special offers) included in the delivery of the boiler!

Description of the activity of the boiler in the mentioned regime:

The working phase of the boiler starts by switching on the room thermostat (the thermostat evaluated low temperature compared with requested) at the moment when the regime control knob is in the winter regime position. The three-way valve relay is disconnected (for boilers with water storage heating); the of circulating pump is activated, as well as the ignition system and ventilator. Ignition of the boiler is for the adjusted starting output. It remains for 2 seconds after activation of the boiler. The output is then decreased to the minimum with a slow linear start (about 50 s) to the modulation point stated by service for setting the maximum heating output. The regulation of output of the boiler in this phase is by PID (proportional/integral/derivative) with keeping the temperature set by the wheel on the control panel (within the range 30–80°C). During the whole time of heating, the regulation limit of the output temperature is checked. When heating the system with lower input power than the minimum output of the machine, there is an increase of the output temperature of heating water by 3 °C above the adjusted temperature

(for 30 seconds from ignition, this value is increased to 10 °C). In this phase the boiler interrupts the burning while still running the circulating pump and activates the restriction of reignition (service setting within the range 0 – 10 min.). In this manner the boiler becomes a highly adaptable source of heat due to the high variability of the consequently regulated heating sets (e.g. use of zone regulation, thermostatic valves, etc.).

After disconnection of the spatial thermostat or after switching the boiler into the "WINTER" mode, the burning of the burners is stopped and the pump is ON for the set time (service setting within the range 0 – 10 min.). This function is used for taking the heat from the condensing body and for improving the allocation of temperatures of bodies when using thermostats with PI linkage with short working cycles.

In the case of the installation of the room thermostat eventually, and controller in the reference room, a minimum of one radiator must be left without a thermostat head. To increase thermal comfort, we recommend not to mount thermostatic heads on radiators in the reference room at all.

2.3.3 Operation of the boiler using built-in equithermal regulation

This regime is accessible in the boiler in the standard variant but is not activated. The activation and the primary setting of the regulation is performed at the request of the client by an authorized service technician.

During equithermal regulation the boiler changes the temperature of the heating water automatically according to the changes in the outside temperature.

This manner of regulation can only be used with the connected outside temperature sensor. The outside sensor is located on the coldest wall of the object (north or north-west) approximately 3 m above the ground. The sensor must not be influenced by any other thermal influence such as open windows, sunlight, ventilation shafts, etc.

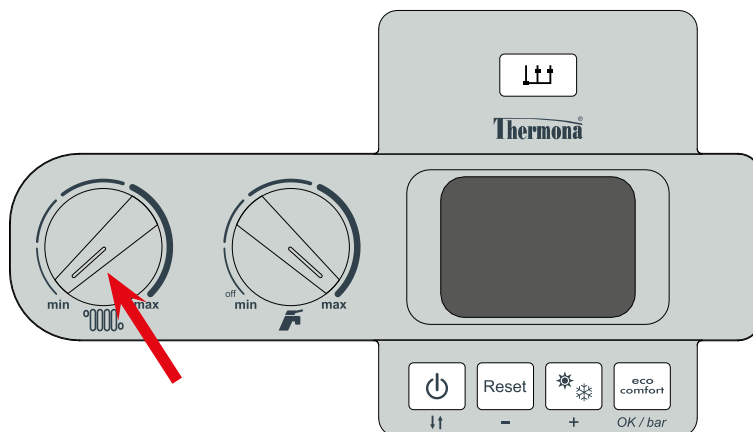
Description of the activity of the boiler in this regime:

The working phases of the boiler are identical with the previous regime with the difference that the temperature for the heating system is automatically set according to the outside temperature (ascertained by the sensor). The calculation of the requested temperature of the heating system is the function of the ambient temperature and the function of the "K" factor (declination of equithermal curve), which is set by the service technician with respect to the locality and nature of the heating system. Using the heating water knob on the control panel, the user sets the requested thermal comfort (correction of the shift of equithermal curve within the range $\pm 15\text{ }^{\circ}\text{C}$ of the heating water).

Adjustment procedure:

When setting the equithermal regulation, it is necessary to distinguish the declination and the shift of the equithermal curve. By setting of **the declination** the following rule applies : in the case of poor thermal-insulating properties of the object, change the parameters of the declination of the curve in the direction of the higher values (the curve is moved upward); in the case of good thermal insulation, the parameter can be decreased (the curve is moved downward).

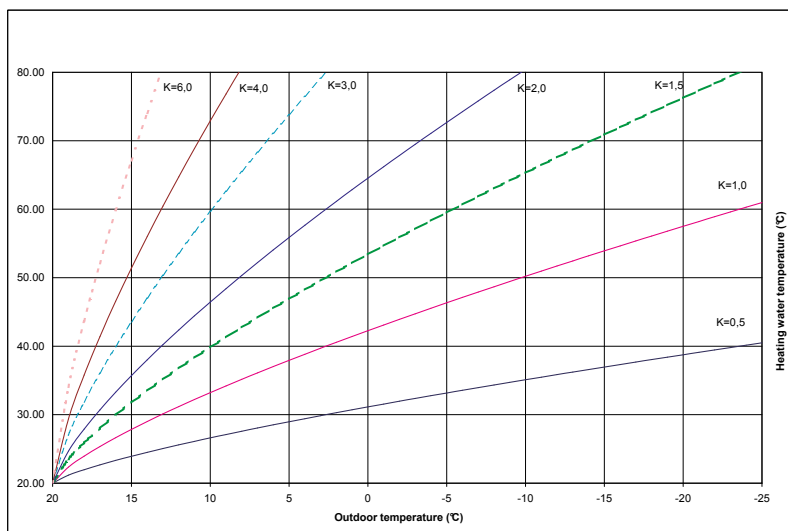
The declination of the curve is set by the authorized technician in the service menu of the automatic control system of the boiler!



! During the activated equithermal regulation the meaning of the function of the middle button on the control panel of the boiler is changed. In this case, the mentioned knob is used to set the shift of the heating curve (within the range $\pm 15\text{ }^{\circ}\text{C}$ from the equithermal curve set by the service technician).

It results from the mentioned facts that using the knob to set the temperature of the heating on the control panel, in this regime, the requested temperature of the heating space is indirectly set. At the beginning (in the production) the equithermal curve is set for "K" = 1.6. The initial user setting of the rotary control knob is in the middle of the setting route (the indicator is up which corresponds to the shift of the curve 0 °C). After inspection of the temperature of the heated space (after approximately 24 hours), it is possible to perform additional setting according to all requirements for thermal comfort. Due to the influence of the equithermal regulation the change of ambient temperatures will be compensated and the level of temperature of the heated space will be automatically kept at a constant level.

Using this regime of regulation, a further decrease of operating costs can be achieved while improving thermal comfort (continuous heating of heating bodies). Finally, this option can be appreciated as pre-regulation of the primary heating circuit when using zone regulation (by mixing valves), etc.



Graph of the course of equithermal curves (zero shift)

The calculated temperature of the heating water is restricted to max. 80°C. If the calculated temperature varies within the range 20 ÷ 35°C the requested temperature is restricted to the minimum temperature of the boiler, i.e. 30°C, and the function of periodical running of the boiler is activated within the fixed interval of 15 minutes and the variable time of running for 35°C according to the formula:

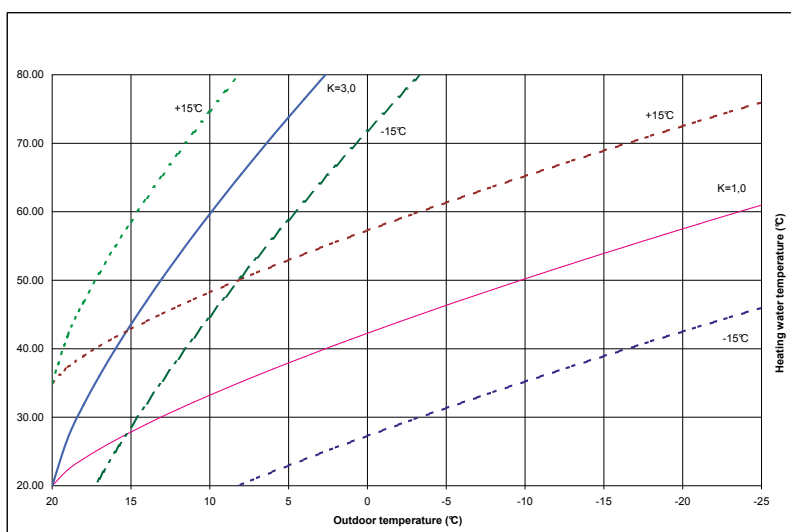
$$T_{on} \text{ (min)} = 15 - T_{off} \text{ (min)} \\ = 30 - \text{calculated equithermal temperature}$$

If the calculated equithermal temperature is ≤ 20°C, the boiler remains off.

Note:

T_{on} = interval of activation of the boiler

T_{off} = remaining interval for the disconnection of the boiler into fixed 15 minutes



Example of the course of selected curves during shift correction (middle turning knob)

2.3.4 Operation of the boiler using built-in equithermal regulation

After ensuring “full value” equithermal regulation (including setting the time programmes, etc.) it is recommended to use intelligent programmable regulator CR 04 or PT 59, which regularly communicates with the microprocessor of the automatic boiler system. There is the transfer of information not only about the required temperature of the heating system depending on the spatial and outside temperature, but also the display of operating information about the boiler (work regime, performance, temperatures, possible failures, etc.). This system is characterized by many adjustable and displayed parameters for optimal control of the heating equipment with modulation of the boiler output.



The mentioned ad-in regulators are not (with the exception of short-term special offers) included in the delivery of the boiler!

2.3.5 Control of cascade boiler rooms

The THERM 49 KD and 65 KD hanging boilers can be connected in a cascade. It is already well known and time-tested principle of boilers, both from the hydraulic and the control point of view. The boiler cascade can be conveniently controlled by our regulation communication system that provides permanent communication between the individual boilers. For this purpose, Thermona delivers cascade regulators, TKR or TKRC, which follow the earlier used interfaces of IU 05 and IU 04.10.



For more information about the principle, design, type of cascade boiler rooms control etc. are available, for example on the website www.thermona.cz.

2.3.6 Heating of utility water (DHW)

As a standard, the THERM 49 KD and 65 KD boilers are modified for heating water in an external indirect heating tank. An external three-way valve must be installed for this purpose.

2.3.6.1 Storage water heating – DESCRIPTION OF THE ACTIVITY (with a thermostat-equipped storage tank)

If the thermostat of the hot water storage tank is ON, the working phase of heating of the storage tank starts. The three-way valve relay is switched on and if the boiler was running in the phase for heating the heating system, the burner and pumps are stopped.

After re-setting of three-way valve (within the time interval of 8 seconds), the pump is activated. After the sequence for the inspection of security elements, the ignition of the burner is enabled.

From detecting the presence of the flame, the starting output of the boiler is kept for 2 seconds and then there is the phase of fluent modulation of the output with PID regulation with the stated value of the temperature of heating of 80 °C. During the whole time of heating, the limits of the regulation of the output temperature are checked. In the case of any increase above 86 °C the burning is stopped and circulating pump remains active. The reignition is in the case of a decrease of the temperature under 75 °C. The working phase of the water heating terminates with the disconnection of the thermostat of the hot water storage tank.

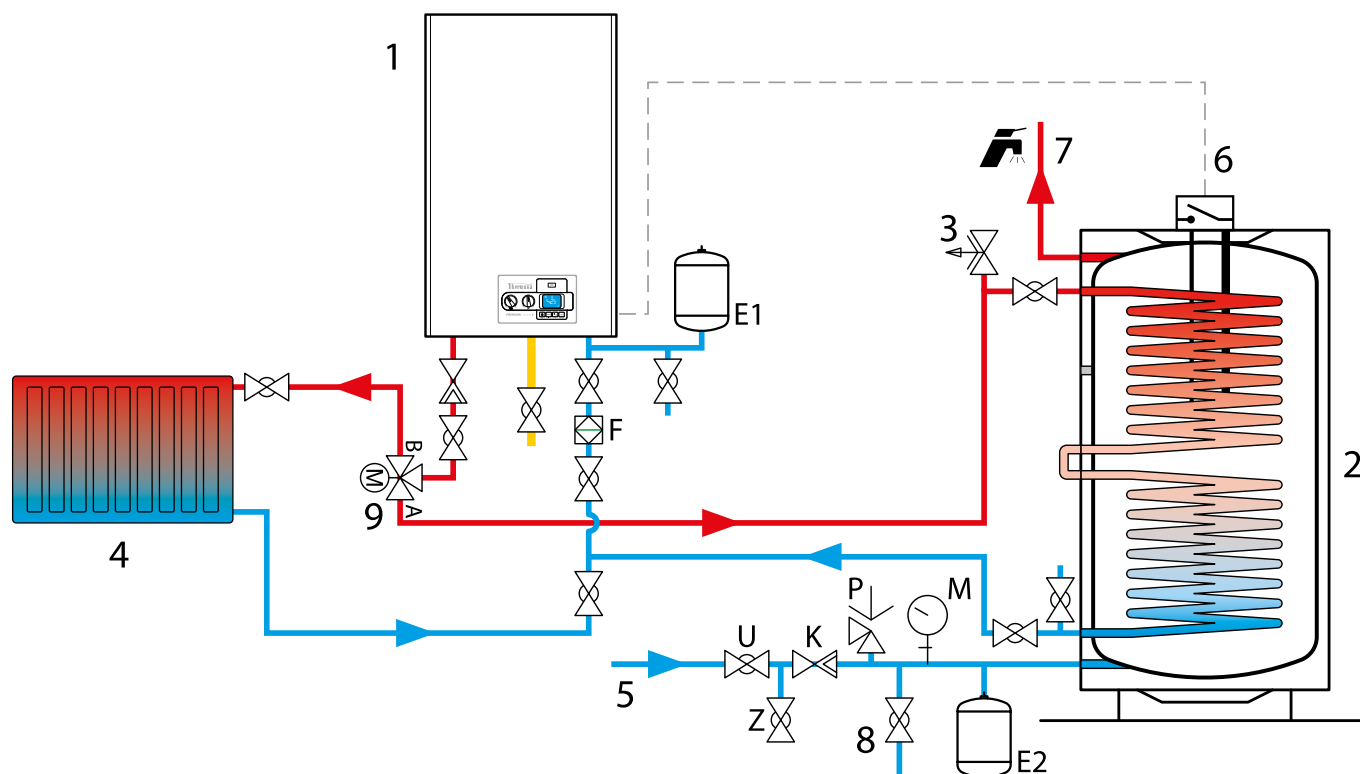
This is followed by stopping the burning and then there is the additional cooling of the exchanger with the time function for the running of the circulating pump (10 seconds). After termination and stopping of the pump, there is switching of the three-way valve and resetting is activated. The time for resetting the three-way valve is treated by the time function for blocking the activity of the boiler for 8 seconds. Only then, can the requested heating of the heating system be run.

In the case of parallel requests, the water heating regime takes priority over the heating of the heating system.

2.3.6.2 Storage water heating - DESCRIPTION OF ACTIVITY (with a storage tank with an NTC temperature sensor)

This working mode has the same behaviour as “Storage water heating” described in previous chapter with the difference that the temperature in the accumulator water storage tank is read by a thermal probe instead of the thermostat for the storage tank. The setting of the requested water temperature is enabled either from the communication line or by the rotary control button for hot water on the boiler panel. The hot water temperature probe must be connected and functional, otherwise the heating of the water is stopped.


The informative connection diagram of the indirect heating storage tank to the gas boiler



- 1 – Gas boiler
- 2 – Indirect heating DHW storage tank
- 3 – De-aerating valve
- 4 – Heating system
- 5 – Supply of cold water
- 6 – Connection of the thermostat for the DHW storage tank
- 7 – Output DHW
- 8 – Discharging valve
- 9 – External three-way valve

- U – Closure on the cold water inlet
- Z – Testing valve
- K – Return valve
- P – Safety valve
- M – Pressure meter
- E1 – Expansion vessel for the heating system
- E2 – DHW expansion tank (recommended)
- F – Filter

2.4 Selected protective functions of the boiler

 **Notification: All the above-mentioned security and registered functions are in activity only if the boiler is connected to the electricity!**

Anti-locking pump function

After 24 hours of inactivity, the pump runs for 30 seconds to prevent any blocking. After 24 hours of inactivity, the three-way valve relay is activated for 10 seconds (if the boiler is fitted with it) due to the same reason. In the case of a request for heating (heating or hot water) during the execution of this function, the anti-blocking function is automatically terminated and the request runs. The anti-blocking function is also active when blocking the activity of the boiler in the position of the driver in the mode "OFF" (if the boiler is still connected to the electricity network).

Anti-freeze heating protection


The boiler is fitted with an anti-freeze protection system which protects the boiler (not the heating system) against freezing. Anti-freeze protection is activated in the case of a decrease of the temperature in the boiler under 6 °C. The pump is activated, the boiler is ignited and heats the heating circuit with a minimum output of 30 °C. The burning is stopped at this temperature and the pump continues running during the function for running the pump. If the boiler is in the status for blocking burning (failure), only the pump is activated. The anti-freeze function is active in all operating modes of the boiler.

Anti-freeze protection of the storage tank (only when hot water temperature is monitored using an NTC sensor)

The anti-freeze protection of the storage tank protects the hot water storage tank (not the hot water distribution) against freezing. The anti-freeze storage tank protection is activated when the hot water temperature, measured by the storage tank sensor, drops below 4°C. The pump starts and the boiler heats the storage tank at minimum output until the temperature of 6°C is reached. Combustion stops and the pump continues to run for 150 seconds.


Anti-cycling

A feature that prevents cycling of the boiler in heating mode when, during the boiler is switched off, it is not permitted to re-ignite the boiler before the set anticyclic time run out (factory default is 3 minutes). This function is mostly used in such heating systems where the maximum thermal loss of the stated object corresponds to the lowest limit of the power range of the boiler.

 **The anti-cycling time within the range 0 - 10 minutes can be only be changed by an authorized service technician!**


Run-out of the pump

The pump run-down is usually factory-set to 30 seconds. After the extinction of the burner caused by the disconnection of the room thermostat, the pump continues to operate during the adjusted run out of the pump. In the case that in the winter regime the boiler is operated without the room thermostat, the pump continues to be ON.

 **The change of the run out of the pump during the operation with the room thermostat may only be performed by an authorized service technician.**


Run-out of the ventilator

After termination of burning, the ventilator is in operation for 30 seconds while keeping the revolutions corresponding to the starting output (taking the remaining of burnt gases from the combustion chamber).

 **With respect to the request for increased checking of the microprocessor once every 24 hours of operation, the forced reset of electronic system is performed with the consequent initialization (it is reflected by short-term interruption of the boiler and deactivation of data on the display similarly as during the activation of the network inlet of the boiler into the socket).**

2.5 Maintenance and service

Regular maintenance is very important for reliable operation, to achieve a long service life, and efficient combustion. The owner or the operator of the gas equipment shall provide annual revision through a service company in compliance with Ordinance No. 21/1979 Coll. of the Czech Work Safety Authority and the Czech Mining Authority, and CSN 386405. The service organisation shall check, for example, the control and safety elements of the boiler, tightness of the gas and water distribution, or clean the boiler and exchanger from burnt dust particles, adjust boiler combustion etc.

 **The regular inspection of the gas boiler includes a preventive replacement of the sensor detecting the presence of the flame - ionizing or combined electrodes.**


For error-free operation of the heating system, it is also necessary to regularly inspect the initial water pressure in a cold condition. In the case of a decrease of pressure below 0.8 bar, it is necessary to additionally fill the heating system.

The external casing of the boiler can be cleaned with a damp cloth and mild detergent. Do not use cleaning agents based on sand and solvents that could damage the finish.

2.5.1 Additionally filling the heating system

Water is added to the heating system (system pressurization) through the supply valve which is a part of the heating system. Water for filling must fulfil the required parameters, see chapter 3.8.

During additional filling it is necessary to take the following conditions into consideration:

-  **a) the pressure of utility water supplied into the boiler must be higher than the water pressure in the heating system (otherwise the heating water can flow back to the water mains!)**
- b) the additional filling of water is necessary to be done exclusively under a cold status (the temperature of the heating water in the boiler is a maximum of up to 35 °C)**

Procedure for additionally filling the heating system with water:

1. Press OK / bar to find out the current pressure in the heating system
2. Slowly open the valve for additional filling and monitor manometer on the control panel of the boiler.
3. Set the system pressure to the necessary value (according to the heating system, recommended 1.0 – 1.5 bar)
4. Close the valve for additional filling

2.6 Warranty and warranty terms

The producer is not liable for any mechanical damage to individual components by rough handling, for damage caused by unprofessional intervention into the electronic system during the adjustment and connection of the add-in regulation, for damages caused by the use of other parts and components than the original components used by the producer.

The warranty is also not applicable to defects caused by non compliance with the binding notifications and terms stated in individual parts of this manual.

The warranty is not applicable to non-standardized relations in distribution networks (variation of electrical voltage – in particular voltage peaks, pressure and cleanliness of gas, etc.), defects to equipment outside the boiler that influence activity, improper collection of burnt gases, dirt in the combustion air, damage from outside influences, mechanical damage, storage, transport and defects originated by natural disasters.

In such cases the service organisation may require that the client pays for the repair.

THERMONA spol. s r. o. provides a warranty according to the stated in the Warranty Certificate delivered with the product.

Terms for application of the warranty:

1. Regular, 1x per year, inspection of the gas boiler. Inspections must only be performed by an authorized organisation, i.e. contractual service. The list of service centres is attached to each boiler. The actual list of service centres is available from www.thermona.cz
2. Documentation for all records of warranty repairs and annual inspections of boilers is in the appendix to this manual.
3. Submitting completed and confirmed warranty certificate and protocol on commissioning into the operation of THERM products

3. INSTALLATION MANUAL

3.1 Basic instructions for assembly of the boiler

The THERM 49 KD AND 65 KD hanging boilers are designed for operation in regular hot-water heating systems.

! Assembly must only be performed by a qualified professional company and it is necessary to pay attention to all advice and notifications contained in this manual. Assembly must be in accordance with valid standards and regulations – see CSN EN 1775, CSN 38 6462, CSN 33 2000 – 7 – 701 ed.2, CSN 06 1008, CSN 73 4201, TPG 704 01, TPG 800 02, TPG 908 02, Regulation No. 48/1982 Coll.

Before installing the boiler the assembly company is obliged to check:

- the type of the boiler corresponds to the ordered boiler
- the selection of the boiler is correct for the stated use (type of gas, heating system, collection of smoke, air suction)
- the delivery is complete

3.2 Complete character of the delivery

THERM hanging boilers are delivered fully assembled. All parts of the boiler are checked and set by the producer before assembly. Each boiler is tested for leakage of the water circuit, leakage of the gas circuit and the regulating and protection parts are set and tested.

The standard delivery of the boiler includes:

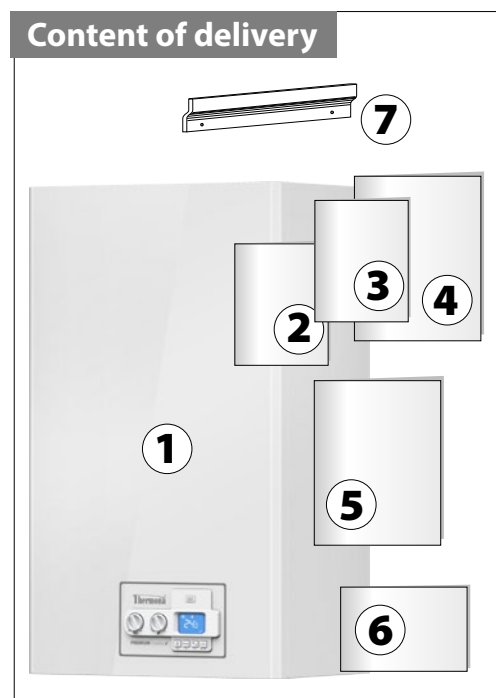
1. Boiler
2. Manual for installation, service and maintenance of boiler
3. Service network (valid for CZE territory)
4. Letter of warranty (3 copies)
5. Protocol on the commissioning of THERM products into operation (valid for CZE territory)
6. Confirmation of completing 1. and 2. service inspection (valid for CZE territory)
7. Hanging bar, including fixation elements

Accessories:

Necessary accessories (collection of gases, regulation, outside sensor, etc.) can be ordered on request. Detailed information can be found in the catalogue of products and accessories or at www.thermona.cz.

! To collect smoke it is necessary to exclusively use equipment to collect gases delivered by the producer of the boiler. Only by doing this will the boiler report the stated parameters for burning, output, efficiency, etc.

In the case of any doubt or inquiries, contact the producer or supplier before assembly.

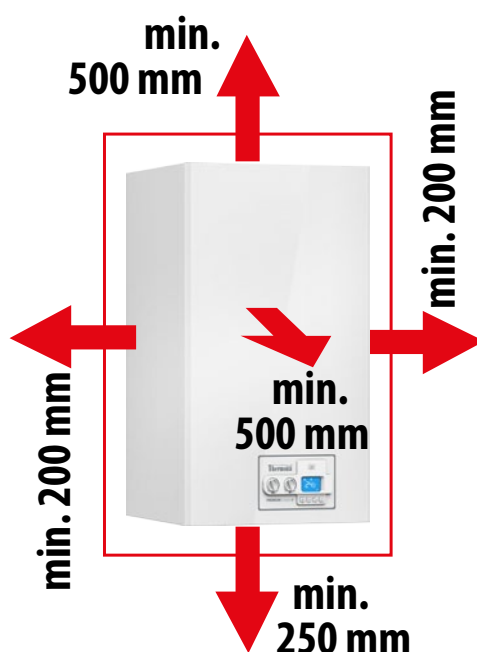


3.3 Location of the boiler

The condensing boilers THERM can be installed in the basic AA5/AB5 environment according to CSN 33 2000-3 and CSN 33-2000-5-51 ed. 3 (range of temperature +5 to 40°C, moisture depending on the temperature up to a maximum of 85%, without harmful chemical influences). The combustion air must not contain halogen-hydrocarbons and vapours from aggressive substances, and must not have high moisture and dust levels.

The THERM 49 KD and 65 KD boiler series are usually installed in non-residential spaces (boiler rooms). If the boiler is installed near the living area, it is recommended to set a limit to the maximum boiler output (in terms of the heating requirements of the object) at the lower limit of the loss output range with regard to lower noise level of the boiler when running at lower outputs.

The THERM hanging condensing boilers **must not be** installed in premises with bathtubs, bathrooms, washing areas and special zones 0, 1 and 2 according to CSN 33 2000-7-701 ed. 2: 2007 and in washing area according to CSN 33 2130 ed.2: 2009. The IP x1D protection of electric parts meets the requirements of resistance to vertically dripping water. The place of installation must be selected to be able to have access in the case of operation and service inspection. The recommended distances are stated in the picture.



Attention:

Items pursuant to CSN 06 1008 must not be located near the contour of the boiler (classified according to CSN EN 13501-1+A1:2010) to the smaller distance as: **100 mm** from materials B – easily flammable, C1 – heavy flammable or C2 – medium flammable **200 mm** from materials C3 – light flammable (e.g. wood-fibre boards, cellulose substances, polyurethane, polystyrene, polyethylene, PVC, etc.)

The safe distance between flammable items and the boiler is 50 mm; from the chimney flue and the control hole 200 mm. Flammable items must not be located at lower distances. The wall on which the boiler will be suspended must be constructed from fire-proof material.

Before starting work that may cause a change of the environment in the area of the installed boiler (e.g. work with painting substances, glues, etc.), it is necessary to disconnect the boiler using the regime switch and to disconnect it from the electricity network (remove the network fork from the socket).

Do not place any flammable objects on the boiler and within a distance that is smaller than the safe distance of the boiler.

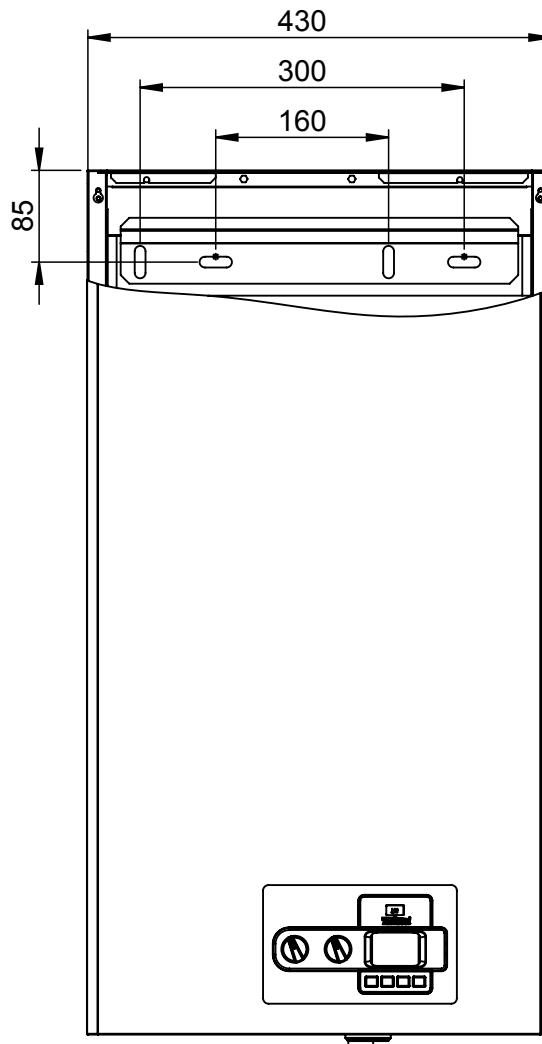
3.4 Suspending the boiler

The THERM 49 KD and 65 KD hanging condensing boilers are mounted on the wall using the hanging strips, delivered together with the boiler, as shown in the picture.

Procedure for hanging the boiler:

1. Consistently measure the position of the suspension of the boiler (according to the diagram with the dimensions)
2. Position the suspension bar on the required place and using a spirit level, balance the bar
3. Mark with a pencil the points where holes will be drilled
4. Remove the bar and using a Ø 10 mm drill, drill the necessary holes
5. Insert dowels into the hole and consequently secure it using the attached bolts
6. Suspend the boiler on the bar
7. Install piping for the exhaustion of burnt gases and the air supply. Fill the space between the piping and the hole in the wall with fireproof material (remember to make sure it can be disassembled for smoke collection).

In the case of installation on a wall with lower load-bearing capacity, it is recommended to consult the installation with a service technician. Around the boiler, due to service inspection or potential service intervention, leave a manipulation area so to be able to easily work with your hands around the boiler using standard hand held tools.

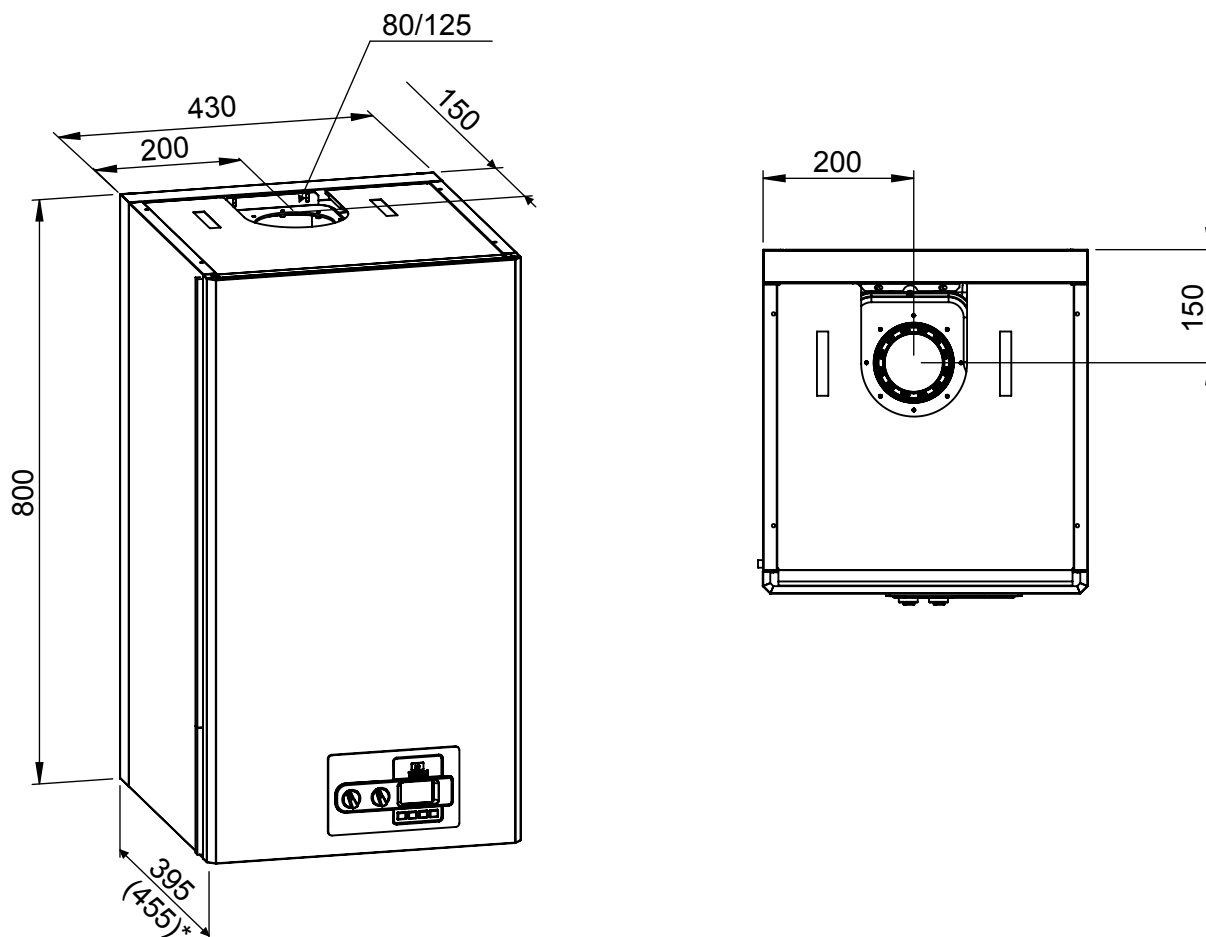


3.5 Connecting the boiler to the hot-water system

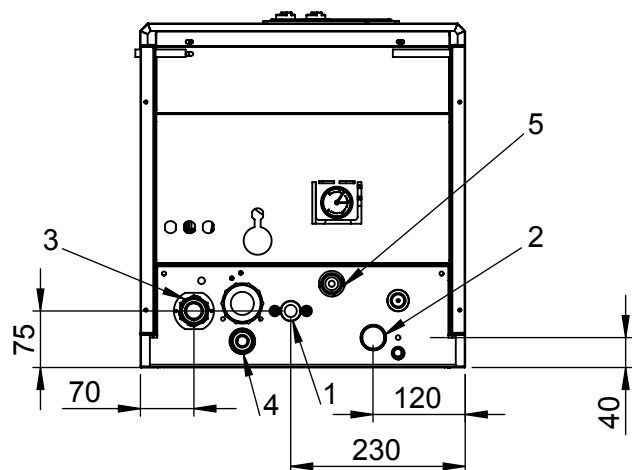
The boilers must be connected to the heating system in such a manner that the power fittings do not stress the connecting outlets of the boiler and there is no aeration.

As it concerns a heat-water flow boiler fitted with its own pump, it is necessary to resolve the connection to the heating system in relation to the calculations of the hydraulic relations of the whole system. Due to the optimal use of the condensing regime of the boiler, it is recommended to design heating systems for low temperatures ($\Delta t = 50/30\text{ }^{\circ}\text{C}$). The minimum overpressure of the system is 0.8 bar. We recommend using the pressure of the heating water in the system within the range 1.0 – 1.5 bar.

3.5.1 Dimensions and connection



* The value in parenthesis is valid for THERM 65 KD

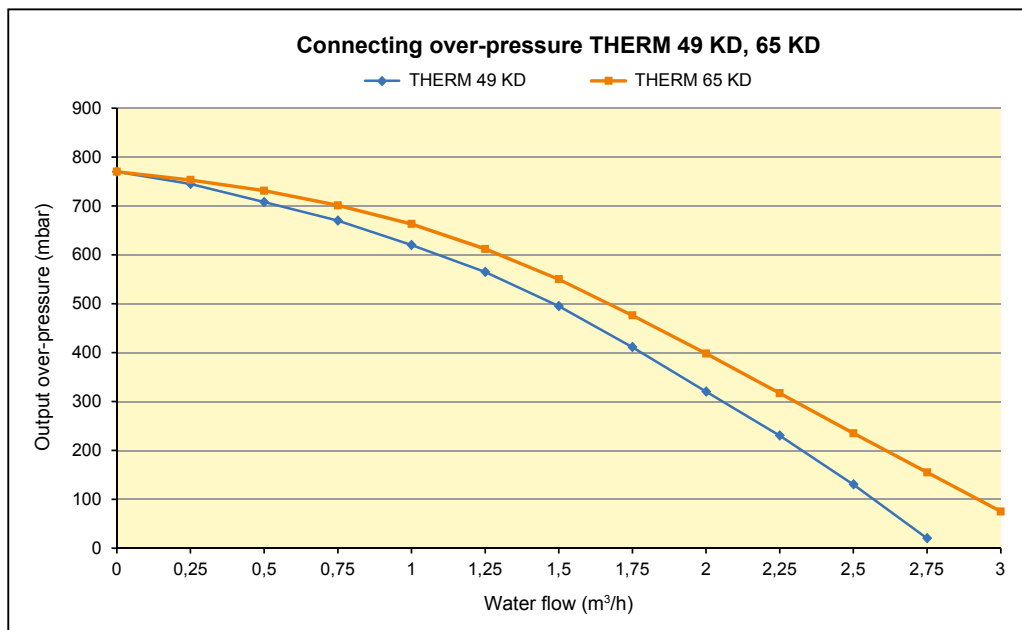


- 1 Input for gas G 3/4" outside
- 2 Input for returned water G 1" outside
- 3 Output for heating water G 1" outside
- 4 Condensate outlet
- 5 Output safety valve

3.5.2 Graphs of the connecting over-pressures of heating water (on the output for heating water)

Attention: The curves of the usable connecting over-pressures of heating water are prepared for the **Wilo Para MS/8-75** pump at the highest regulation level of the PWM regulation.

! Due to the delivered output of the boiler and the resistance properties of the exchanger, we do not recommend decreasing the output of the pump.



! The piping system must be located to prevent the origination of air bubbles with the aim to make de-aeration easy. The de-aerating elements should be mounted on all the highest located parts of the heating system and also on all heating bodies.

Before testing and commissioning, according to CSN 06 0310, the assembly must include perfect flushing of the heating system up to fully clean status. To prevent the penetration of dirt into the boiler system, the entrance of the return water from the heating system into the boiler must be fitted with a suitable filter and sludge separator. It is necessary to clean and inspect the filter and sludge separator in regular intervals.

The heating system must be implemented in accordance with CSN 06 0830 – Heating systems in buildings – Security equipment and with CSN 06 0310 – Heating systems in buildings – Design and assembly.

! The producer requires:

- installing a filter and a sludge trap with a magnet on the return water inlet
- mount a bypass valve in heating systems with thermostatic valves
- install the valve in the lowest point of the system near the boiler for filling and discharging the heat-carrying medium from the heating system and for sludge separation
- mount de-aerating equipment on the output of the boiler and on the top point of the heating system
- fit a hydraulic balancer of dynamic pressures on the heating water outlet from the boiler and separate the primary and secondary circuit hydraulically

The producer recommends:

- to fill the system with soft water according to CSN 07 7401
- to separate the boiler on the input and output with a stop valve (see CSN 06 0830), so in the case of inspection, repair of the boiler or cleaning of the filter, it is not necessary to discharge the whole system

3.5.3 Expansion tank

The THERM 49 KD and 65 KD boilers are not equipped with a heating system expansion tank. The heating system is necessary to provide with an external expansion tank with the volume specified in the heating project.

3.5.4 Using anti-freeze mixtures

It is not recommended to fill heating systems with anti-freeze mixtures due to their properties. This generally concerns the decrease of the delivery of heat, large volume expansion, ageing and damage to the rubber parts of the boiler.

3.5.5 Safety valve

In the lower part of the boiler is a safety valve. When operating the boiler, under certain circumstances, there can be penetration of water or escape of steam from the safety valve. Due to this reason it is recommended to install on the output of the safety valve suitable leakage which will terminate into the waste system.

! Under no circumstances is it permitted to manipulate with the safety valve during operation of the boiler!

3.6 Connection of the boiler to the gas distribution

! Prior to connecting gas, it is required to check that the connecting conditions (connecting gas pressure, gas type etc.) correspond with the terms and conditions approved for this type of boiler.

The boiler must only be connected to gas by an authorized firm according to ČUBP Regulation and ČBU 21/1979 Coll. (as amended by Regulation 554/1990 Coll.) by employees with the qualification according to FMPE Regulation 175/1975 Coll. (as amended by FMPE Regulation 18/1986 Coll.) and according to the approved documentation for gas installation. It is not necessary to install the gas regulator before the boiler. It is contained in the compounded gas fitting which is part of the boiler. In the boiler input there must be a ball valve with the respective attestation for gas. The gas closure must be freely accessible. The boiler is designated for operation with natural gas with calorific capacity 9 – 10,5 kWh/m³ and a nominal pressure in the distribution network of 20 mbar.

! After the termination of the assembly of the gas lines to the boiler, it is necessary to consistently check the tightness of all joints!

3.7 Filling and discharging of the heating system

When filling the heating system the boiler must be disconnected from the electricity network by disconnecting the fork from the socket. Filling must be done slowly so that the air can flow through the respective de-aerating valves. The water for the first filling and for additional filling must be according to CSN 07 7401 clear, without colour, without suspended substances, oil and chemically aggressive ingredients, must not be acid (pH must not be lower than 7), with minimum carbonate hardness (max. 3.5 mval/l). For modification of the hardness, it is necessary to use preparations approved by producer.

3.7.1 Procedure for filling the heating system:

1. check and adjust the pressure in the expansion vessel according to the stated static pressure in the system.
2. open the charging valve of the heating system and on the manometer monitor the increasing pressure in the heating system
3. the pressure should be within the range from 1.0 to 1.5 bar after the heating system is filled
4. carefully de-aerate all radiators (during the circulation of water no air bubbles should be heard)
5. check the water pressure in the system again – after de-aeration it will probably be to pressurize the heating system
6. Check that the de-aerating valves on the heating bodies are closed, the automatic de-aerating valve in the boiler will remain slightly opened!
7. Before activating the boiler, the water circuit must be thoroughly de-aerated.

If these requirements are not fulfilled, the warranty for damaged components will not be applicable.

3.7.2 Additional filling of water into the heating system

The additional filling of water into the system is described in the Chapter "Maintenance and Service" and in the „User Manual“ part.

3.7.3 Discharging of water from the heating system

The full discharging of water from the whole heating system must be resolved by the system discharging valve located in the lowest point of the heating system.

3.8 Condensate outlet

The boiler is fitted with an odour closure (siphon), which must be flooded before running the boiler with about 200 ml of water. Firstly, it is necessary to connect neutralizing equipment to the outlet for the condensate and then to discharge the condensate to the sewerage piping. The discharging of the condensate into the sewerage piping is governed by national or regional (local) regulations.

The collection piping must have a minimum declination of 5° from the boiler into the sewerage piping and must not be blocked (in the case of blocking the collection of the condensate, there is resonance of the combustion chamber of the boiler chamber).

Condensate analysis

Impurities	Unit of measure	Value	
		THERM 49 KD	THERM 65 KD
NO ₂	mg.l ⁻¹	0.05	0.05
Copper (Cu)	mg.l ⁻¹	2.83	2.81
Lead (Pb)	mg.l ⁻¹	0.044	0.047
Cadmium (Cd)	mg.l ⁻¹	0.00014	0.00016
Zinc (Zn)	mg.l ⁻¹	0.605	0.603

Pointer	Value	
	THERM 49 KD	THERM 65 KD
pH	2.6	2.6

3.9 Design of gas exhaust

The exhaust for burnt gases of these types of boilers must be designed by means of the certificate smoke collection system delivered by the producer. From the viewpoint of checking the route for burnt gases, it is necessary to ensure that the exhaust for burnt gases has a suitable revision hole. The exhaust for burnt gases and any connection to the chimney must be in accordance with valid standards. The actual performance of the exhaust for burnt gases must be designed and prepared in the project for the connection of the boiler while respecting the standard rules for collection of condensate. The horizontal piping must be installed with the slope 2° from the terminal unit in the direction from the boiler to prevent any escape of the condensate (and possible freezing) from the terminal unit of the exhaust into the surroundings.

For the THERM 49 KD and 65 KD condensing boilers, the following methods of burnt gases exhaust are approved:

- coaxial smoke collection tube with a diameter of 80/125 mm
- separate smoke collection tube with a diameter of 2 x 80 mm

Permitted maximum lengths of smoke collection tube:

Diameter of the smoke collection tube	Maximum length - horizontally	Maximum length – vertically
80/125 mm	5 m	5 m
2x 80 mm	2 x 5 m	2 x 5 m

Minimum length of smoke collection is 1 m. The first knee in the case of horizontal smoke collection is included into the maximum length of smoke collection. The second and subsequent further knees shorten the maximum length by:

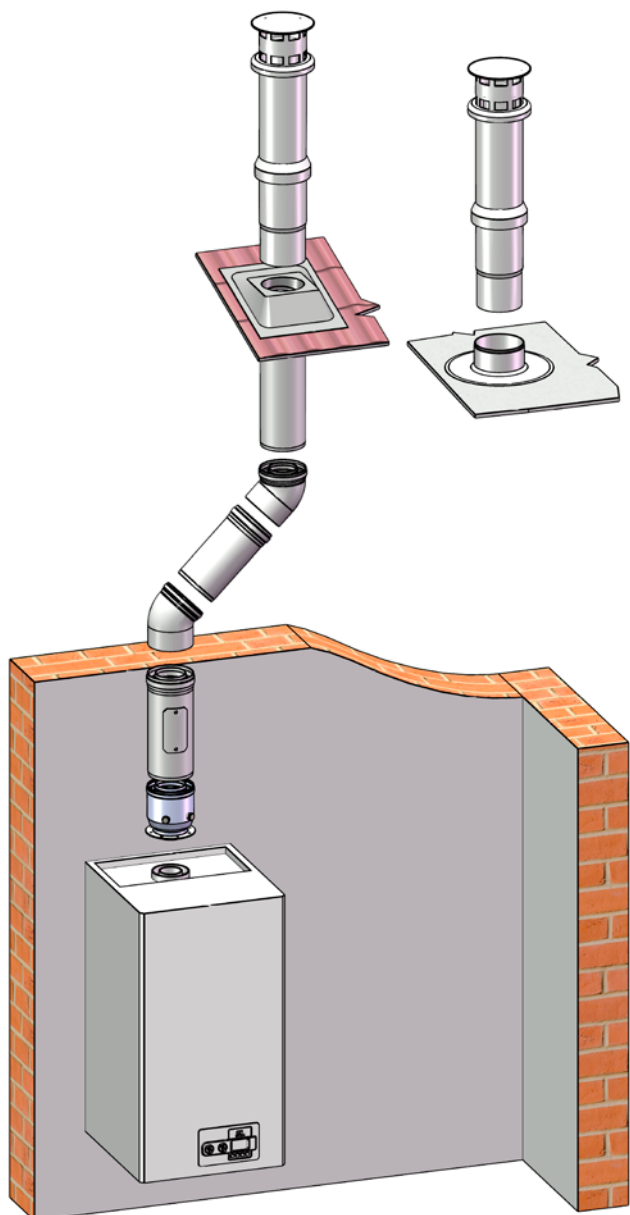
- 0.50 m – knee 45°
- 0.75 m - knee 90°

Maximum pressure loss of smoke collection 150 Pa for THERM 65 KD.

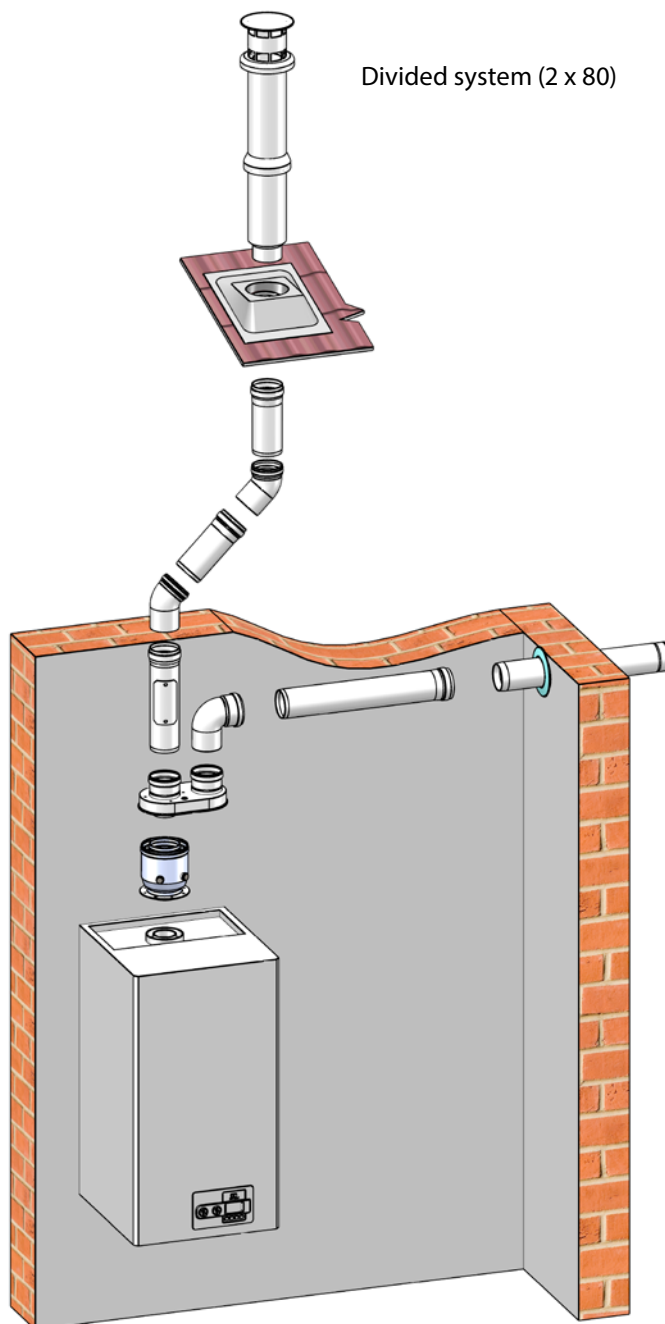
Maximum pressure loss of smoke collection 95 Pa for THERM 49 KD.

Example of gas collection

Coaxial system (80/125)



Divided system (2 x 80)



3.10 Connection of the boiler to the storage tank

The THERM 49 KD and 65 KD boilers (with a three-way valve extension) can also provide hot water heating (DHW) together with the heating system in a reliable and efficient way. A detailed description of the water heating is in Chapter 2.3.6.



The output of the boiler to which the water storage tank is connected, should correspond to the nominal output of the heating insert or heat exchange of the surface in the storage tank. In the case of over-sizing of the boiler related to the heating insert, there is overheating of heating water in the stated circuit and consequent cycling of the boiler. This phenomenon closely relates to the increased consumption of gas.

3.11 Connection of the boiler to electricity

Boilers are fitted with a three-conductor supply cord with an non-separated fork according to CSN 34 0350 ed.2: 2009. The connection to the network is performed pursuant to the requirement of Article 25.1 CSN EN 60335-1 ed.3: 2012. into the network socket located at the boiler. The socket must fulfil the following requirements: must fulfil protection against the hazardous contact of non-live parts in TN networks TN (formerly called zeroing) or in TT network (formerly called grounding) and the connection must be made according to **CSN 33 2180** so that the protective pin is on the top and the middle or zero conductor is connected (front view) to the right hollows. The network voltage must be 230 V ± 10%. Furthermore, the boilers are equipped with an M8 bolt to which an earthing conductor must be connected – protective bonding.



The installation of the socket, connection of the room thermostat and the service of the electrical part of the boiler must only be carried out by person with the respective professional electro-technical qualification according to the Regulation No. 50/1978 Coll..

3.11.1 Connection of the room thermostat

To control the boiler by the room thermostat, only such a thermostat that has voltage-free contact can be used, i.e. no other voltage is supplied into the boiler.

It is necessary to connect the room thermostat to the boiler by a two-core conductor. The recommended cross-section for connection of the room thermostat for a copper conductor (wire) is from 0.5 to 1.0 mm².

The terminal board for connection of the room thermostat is located on the control panel, under the front cover of the boiler (see the boiler wiring diagram). It is equipped in production with an interconnecting unit. The interconnecting unit is removed only when connecting the room thermostat!

3.11.2 Connection of a room regulator with OpenTherm+ communication

The intelligent room regulator is connected similarly as the connection of the traditional spatial thermostat. The regulator is connected to the same terminal. It is not possible to connect two types of regulators at the same time!

Technical recommendation during the connection of the regulator with OpenTherm+ communication with the boiler

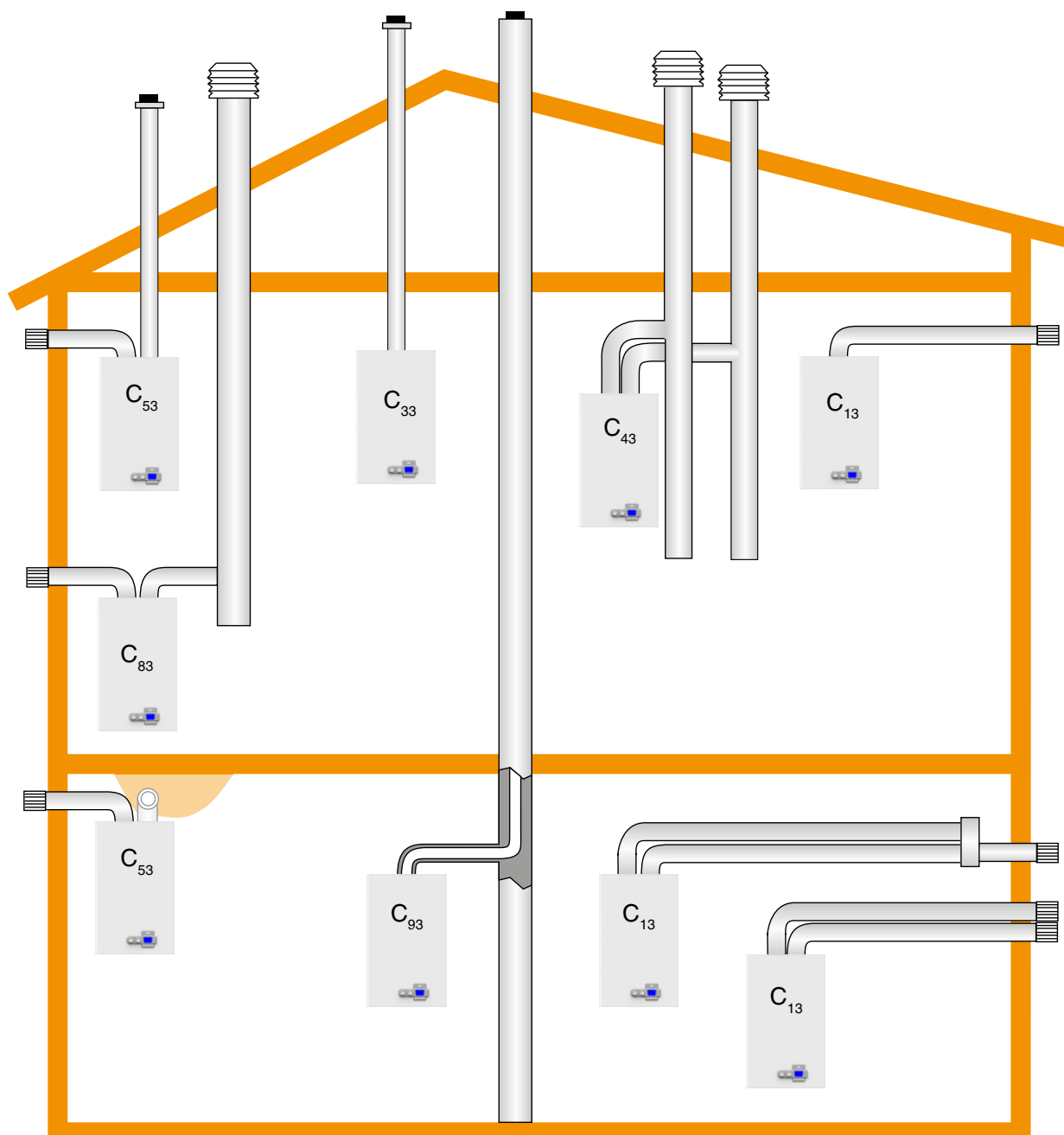
The connecting cable supplies the regulator for the transfer of the signal of the mutual communication by the protocol OpenTherm+ between the automatic system of the boiler and the regulator.

Number of conductors in the line :	2
Maximum length of the line :	50 metres
Maximum resistance of the line :	2 x 5 Ohm
Polarity :	non polarized connection (conductors can be exchanged)



To prevent the resolution of the communication, it is necessary to use a pair or a shielded pair of conductors! The connecting cable must not run in parallel or cross the power lines! The cable shielding must be mutually interconnected and grounded to the faston grounding to the automatic boiler system (the shielding must not be grounded to the body in several places!). For example, a SYKFY cable is recommended.

3.12 Boiler installation options



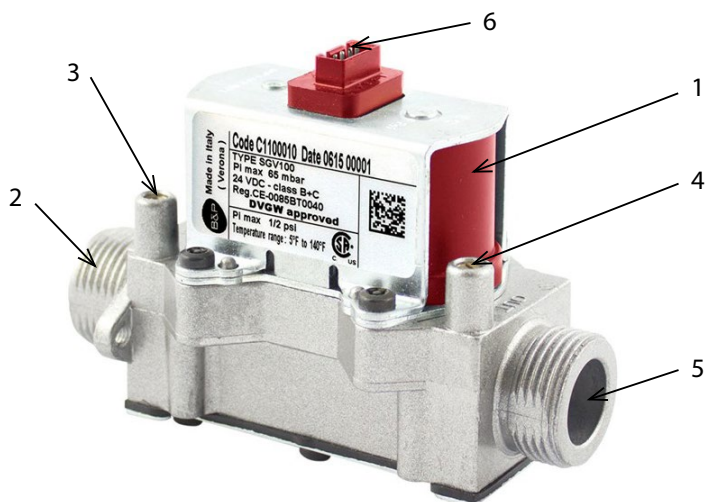
Construction:

- C₁₃** - Coaxial horizontal variant with termination to the peripheral wall. The piping can be double, the termination is either concentric or closely located (location inside the square with the side 50 cm), so it is affected by the same atmospheric conditions.
- C₃₃** - Coaxial vertical variant with termination on the roof. The piping can be double, the termination is either concentric or closely located (location inside the square with the side 50 cm and the distance between the areas of two holes must be less than 50 cm) so it is affected by the same atmospheric conditions.
- C₄₃** - Separated connection to two pipes of the common chimney shaft. The termination of shafts is either concentric or closely located (location inside the square with the side 50 cm), so that it is affected by the same atmospheric conditions. The C₄ boilers and their connecting piping are only suitable for connection to a chimney with natural draught.
- C₅₃** - Separated pipe with termination to the peripheral wall or on the roof, in different pressure zones, but under no circumstances to two opposite peripheral walls.
- C₈₃** - Separated connection with the collection of burnt gases from a separate or common chimney. Supply for the combustion gas is from the peripheral wall. The flow of condensate into the boiler is not permitted.
- C₉₃** - The current vertical piping, e.g. reconstructed chimney, is used as combustion air inlet pipeline. The minimal usable diameter / effective area of the cross section of the vertical piping used for combustion air must be 75 cm². The area for delivering combustion air must be free from all impurities (ash, dust etc.).

4. ADDITIONAL INFORMATION FOR SERVICE

4.1 Gas fitting B&P SGV - setting

SGV (Smart Gas Valve) is an electronically controlled gas valve that ensures an ideal mixture for optimal combustion in all operating statuses in cooperation with the multiphase fan, mixer and control automatics of the boiler. SGV is automatically set during commissioning of the boiler by activating the auto-calibration function with optional manual corrections.



- 1 – Solenoid coils
- 2 – Gas inlet
- 3 – Measuring adapter for the input gas pressure
- 4 – Measuring adapter for the output gas pressure
- 5 – Gas outlet
- 6 – 24 VDC connector

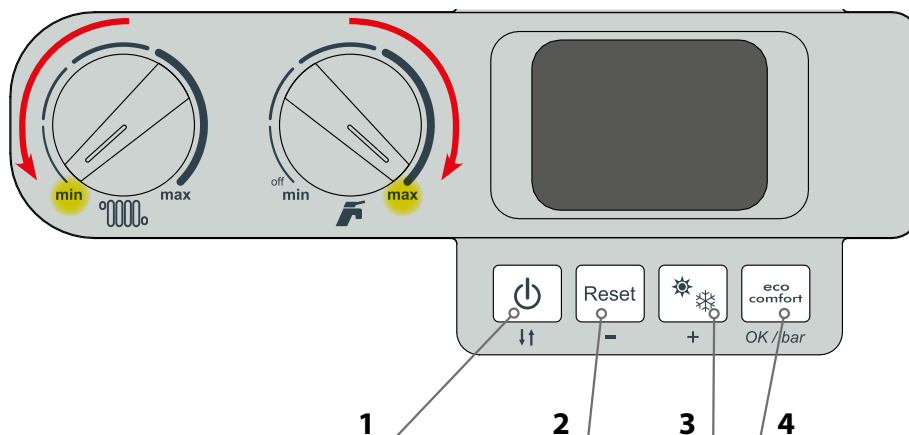
The configuration must be secured against unauthorised use.

4.2 Adjusting boiler combustion (calibration)

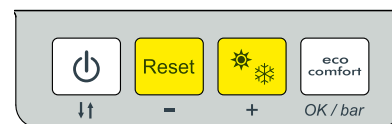
The control panel of the boiler allows two combustion calibration modes – automatic and manual. The principle of operating the boiler during calibration is similar in both cases. In the first phase, the boiler performs the initial automatic calibration sequence (up to several minutes), then manual correction of the combustion setting is possible. In case of manual calibration, the control automatics allows to perform ± 3 correction steps. In automatic calibration, correction is unlimited. The type of calibration (MANU or AUTO) is selected in advance via a parameter in the service menu. Manual calibration is factory-set.

Combustion calibration function activation

Prior to the activation of the calibration function, set the turn control for setting heating water to the minimum position and the turn control for setting hot water to the maximum position. The calibration is activated by holding buttons 2 and 3 for 5 seconds at the same time. The calibration function activation is not available when the room thermostat (ON/OFF) is on (the terminal is engaged). Prior to activation, the terminal for the connection of the room thermostat on the boiler control panel must be disconnected, or the regulator must be disconnected from the OpenTherm communication.



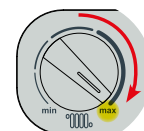
After the calibration activation, the display shows "Au" or "Ma" in relation to the selected method of calibration (service menu). When the burner is ignited, the initial calibration sequence takes place (up to several minutes), during which the display alternates between "--" and the measured heating water temperature. When the initial calibration sequence is complete, the display shows "P0" – the control automatics is prepared for correction of the CO₂ setting at minimum boiler output. The correction is done by buttons 2 (reduces the value of CO₂ when manual calibration is selected) and 3 (increases the value of CO₂ when manual calibration is selected).



When the required CO₂ value is reached, turn the knob for setting heating water temperature to the middle position – the boiler gradually increases output to the medium value (starting output) and then "P1" is displayed. The control automatics is prepared for the correction of the CO₂ setting at medium boiler output. The correction is done by buttons 2 (reduces the value of CO₂ when manual calibration is selected) and 3 (increases the value of CO₂ when manual calibration is selected).



In the end, turn the knob for setting heating water temperature to the maximum position – the boiler gradually increases output to the maximum value and then "P2" is displayed. The control automatics is prepared for the correction of the CO₂ setting at maximum boiler output. The correction is done by buttons 2 (reduces the value of CO₂ when manual calibration is selected) and 3 (increases the value of CO₂ when manual calibration is selected).



When the combustion calibration function is active, it is not possible to use the heating water temperature knob to change the boiler output (fan speed) as in the chimney sweeper function.

Combustion calibration function deactivation

To deactivate the combustion calibration function, hold buttons 2 and 3 at the same time for 5 seconds. The combustion calibration function automatically ends after 15 minutes.

! The boiler combustion may only be adjusted by an employee of an authorised service organisation!

Prescribed setting values THERM 49 KD

Fuel: **Natural gas** **H group**

Screen diameter [mm]	Output [kW]	Fan speed [rpm]	CO ₂ [%]	O ₂ [%]
7.1	45.5	5800	8.9–9.3	5.1–4.5
7.1	25.9	3000	8.9–9.3	5.1–4.5
7.1	6.2	1100	8.9–9.3	5.1–4.5

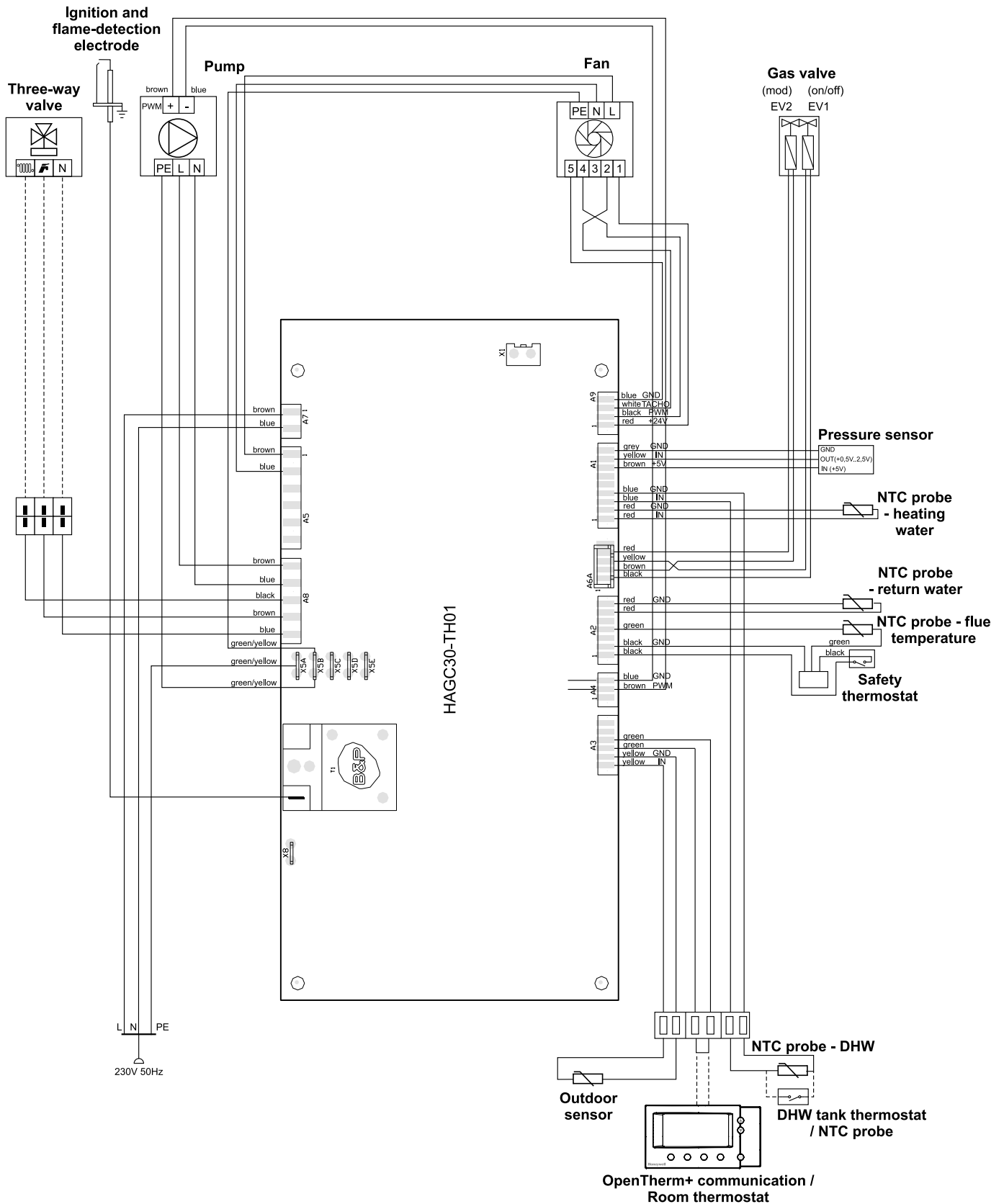
Prescribed setting values THERM 65 KD

Fuel: **Natural gas** **H group**

Screen diameter [mm]	Output [kW]	Fan speed [rpm]	CO ₂ [%]	O ₂ [%]
11.5	63.0	6600	8.9–9.3	5.1–4.5
11.5	35.2	4000	8.9–9.3	5.1–4.5
11.5	7.3	1150	8.9–9.3	5.1–4.5

! The regular annual inspection of the gas boiler includes a preventive replacement of the sensor detecting the presence of the flame - combined electrodes.

4.3 Electrical connection diagram



5. RECORD OF WARRANTY AND POST-WARRANTY REPAIRS AND ANNUAL CONTROLS

Performed action	Contractual organisation	Signature of client	Date of record

Notification of package and product disposal after termination of its service life:
 All materials used are fully harmonized with the requirements stated in Section 10 of Act No. 185/2001 Coll. and section 6 of Act No. 477/2001 Coll..
 The packaging of the product is collected by collecting units for paper waste, wrapping foil into the collection units for plastics.
 Parts of the boiler from steel, copper and copper alloys are collected into the sorted metal collection units.
 The thermal insulation of the combustion chamber is harmless to health and is disposed of in common communal wastes.
 For storage it is necessary to ensure standard storage conditions (non-aggressive and dust-free environment, range of temperatures 5 to 50 °C, air moisture up to 75 %, with the prevention of biological influences, shocks and vibrations).
To comply with the ecological parameters of the product, it is necessary to ensure inspection and maintenance each year. This inspection includes complete cleaning of the boiler and adjustment of the burner.

Product information sheet

as required by the EU Commission Regulation No. 811/2013 and 813/2013

Model/s: **THERM 49 KD**

Condensing boiler: YES

Low-temperature (**) boiler: NO

B1 boiler: NO

Combination heater: NO

Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Seasonal space heating energy efficiency class	A			Seasonal space heating energy efficiency	η_s	92	%
Rated heat output	P_{rated}	49	kW				
For boiler space heaters and boiler combination heaters: Useful heat output				For boiler space heaters and boiler combination heaters: Useful efficiency			
At rated heat output and high-temperature regime (*)	P_4	45,50	kW	At rated heat output and high-temperature regime (*)	η_4	87,92	%
At 30% of rated heat output and low-temperature regime (**)	P_1	7,76	kW	At 30% of rated heat output and low-temperature regime (**)	η_1	96,39	%
Auxiliary electricity consumption				Other items			
At full load	el_{max}	0,160	kW	Standby heat loss	P_{stby}	0,061	kW
At part load	el_{min}	0,091	kW	Ignition burner power consumption	P_{ign}		kW
In standby mode	P_{SB}	0,004	kW	Emissions of nitrogen oxides	NO_x	23	mg/kWh
				Sound power level, indoors	L_{WA}	54	dB
For combination heaters:							
Water heating energy efficiency class				Water heating energy efficiency	η_{wh}		%
Declared load profile							
Daily electricity consumption	Q_{elec}		kWh	Daily fuel consumption	Q_{fuel}		kWh
Annual electricity consumption	AEC		kWh	Annual fuel consumption	AFC		GJ

(*) High-temperature regime means 60 °C return temperature at heater inlet and 80 °C feed temperature at heater outlet.

(**) Low temperature means for condensing boilers 30 °C, for low-temperature boilers 37 °C and for other heaters 50 °C return temperature (at heater inlet).

Product information sheet

as required by the EU Commission Regulation No. 811/2013 and 813/2013

Model/s: **THERM 65 KD**

Condensing boiler: YES

Low-temperature (**) boiler: NO

B1 boiler: NO

Combination heater: NO

Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Seasonal space heating energy efficiency class	A			Seasonal space heating energy efficiency	η_s	90	%
Rated heat output	P_{rated}	69	kW				
For boiler space heaters and boiler combination heaters: Useful heat output				For boiler space heaters and boiler combination heaters: Useful efficiency			
At rated heat output and high-temperature regime (*)	P_4	63,00	kW	At rated heat output and high-temperature regime (*)	η_4	87,70	%
At 30% of rated heat output and low-temperature regime (**)	P_1	11,50	kW	At 30% of rated heat output and low-temperature regime (**)	η_1	95,92	%
Auxiliary electricity consumption				Other items			
At full load	el_{max}	0,075	kW	Standby heat loss	P_{stby}	0,065	kW
At part load	el_{min}	0,024	kW	Ignition burner power consumption	P_{ign}		kW
In standby mode	P_{SB}	0,004	kW	Emissions of nitrogen oxides	NO_x	21	mg/kWh
				Sound power level, indoors	L_{WA}	54	dB
For combination heaters:							
Water heating energy efficiency class				Water heating energy efficiency	η_{wh}		%
Declared load profile							
Daily electricity consumption	Q_{elec}		kWh	Daily fuel consumption	Q_{fuel}		kWh
Annual electricity consumption	AEC		kWh	Annual fuel consumption	AFC		GJ

(*) High-temperature regime means 60 °C return temperature at heater inlet and 80 °C feed temperature at heater outlet.

(**) Low temperature means for condensing boilers 30 °C, for low-temperature boilers 37 °C and for other heaters 50 °C return temperature (at heater inlet).

NOTE

A series of horizontal dashed lines for taking notes, occupying the majority of the page below the 'NOTE' header.

7. CERTIFICATE OF PRODUCT QUALITY AND COMPLETENESS

THERM gas condensing boilers

Indication of model: **THERM 49 KD**
THERM 65 KD



Serial number:

The product delivered with this certificate corresponds to valid technical standards and technical conditions. The product was produced according to the respective drawing documentation, within the required quality and is approved by the Technical Testing Institute in Piešťany, Slovak Republic, EC notified body, identification number 202.

The following certificates have been issued for the **THERM 49 KD** boilers: 1015-GAR-00917-21, LVD-B-01193-21, EMC-B-01194-21, 1015-BED-01163-21, B-01165-21, B-01164-21.

The following certificates have been issued for the **THERM 65 KD** boilers: 1015-GAR-01427-20, LVD-B-01444-20, 813-B-01435-20, 1015-BED-01428-20, EMC-B-01445-20, 811-B-01434-20.

Country of destination:

Country	Category	Connecting overpressure in mbar		Construction
		Natural gas (G 20)	Propane (G 31)	
AT, BG, CH, CZ, DK, EE, ES, FI, GB, GR, HR, IE, IT, LT, LV, NO, PT, RO, SE, SI, SK, TR	I _{2H}	20	-	C _{13'} C _{33'} C _{43'} C _{53'} C _{83'} C ₉₃
HU	I _{2H}	25	-	
DE, LU, PL, RO	I _{2E}	20	-	

Technical inspection

date:

seal and signature:

všetchno co děláme hřeje

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04/2022

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