

Manual for installation, operation and maintenance of boiler

THERM 24 KDNS

Stationary gas condensing boiler



Thermona[®]



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

THERM 24 KDNS

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1. GENERAL INFORMATION



Please note that it is necessary to follow the notifications given.

1.1 Use

The stationary condensing boilers THERM 24 KDNS are gas hot water boilers that burn natural gas. They 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. Operation is economical and does not strain so the environment. The output can be fluently regulated within the scope of 20 – 100 % and adapted automatically to immediate thermal losses from the object.

In addition to heating, the THERM condensing boilers can be used for heating hot water as well (hereinafter referred to as DHW) in indirect-heating storage tanks under the condition that the required additional equipment is provided.



The boiler is designed for closed heating systems fitted with an expansion vessel or open expansion vessel in min. height of 8 m above the boiler.

1.2 Equipment details

1.2.1 Equipment description

- stationary condensing boiler designed for heating buildings with a thermal loss of up to 27 kW
- option to heat water – heating in indirect heating storage tank
- natural gas operation or propane
- fully automated operation
- low consumption of electricity
- automatic fluent output modulation
- simple boiler control
- high comfort level
- built-in equithermic regulation
- built-in automatic by-pass
- ability to control by the superior indoor thermostat or intelligent indoor control unit
- high level of operational safety
- security elements of the boiler prevent overheating of the boiler or the escape of the effects of burnt gases
- built-in energy-saving circulating pump with electronic speed modulation
- safety valve 3 bar
- protective functions (anti-freeze protection, pump protection, etc.)
- electric ignition (saving of fuel)

1.2.2 General description

The basic element of the THERM stationary gas condensing boilers is a frame that forms the load-carrying part of the boiler, onto which the individual boiler components are installed. In the upper part of the boiler is a condensing body, which associates the combustion chamber with the burner and the stainless exchanger. The removable front wall of the body is fitted with two electrodes (ignition and ionizing), an inspection sight-glass, a burner and shaped piping for the supply of gas mixed with air.

A suitable ratio of gas mixed with air is ensured by the mixer in cooperation with a gas fitting. It consists of a gas pressure regulator, two solenoid blocking valves and ratio regulation of the output volume of gas with elements for mechanical setting. The whole mixture preparation system also includes a fan with electronically controlled speed.

Condensate is created during the operation of the condensation boiler. The outflow of condensate from the condensation body and the exhaust piping for burnt gases 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 bypass, a valve for filling up the heating system, a pressure sensor, a safety valve, the connection to the expansion vessel etc.

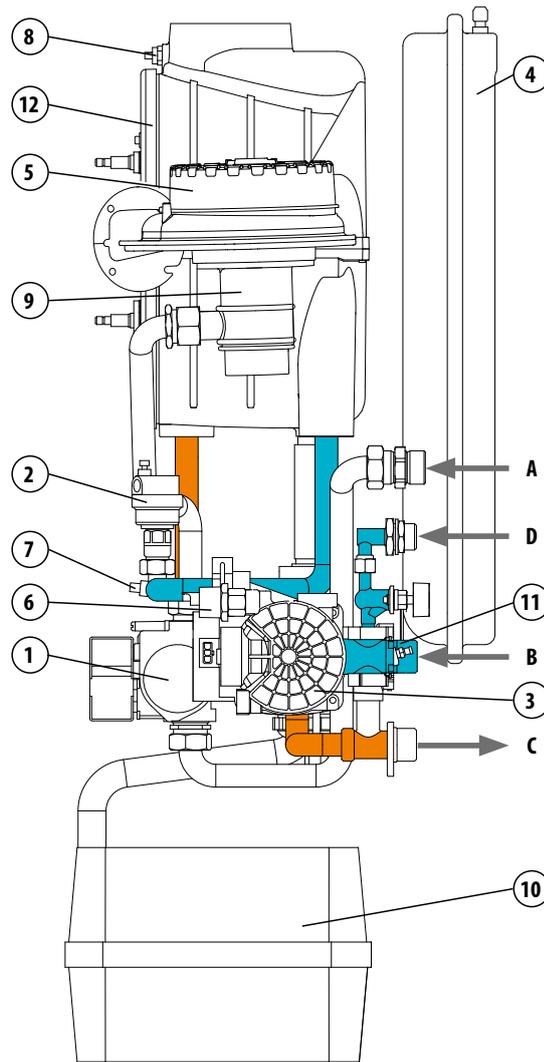
In the upper part of the boiler, under the hinged cover, there are control elements and display (see “User Manual” chapter). The control panel includes control microprocessor automatics for controlling the activities of the boiler, control, boiler safety and regulation.

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

THERM 24 KDNS

- 1 - Gas valve
- 2 - De-aerating valve
- 3 - Circulation pump
- 4 - Expansion heating vessel
- 5 - Ventilator
- 6 - Pressure sensor
- 7 - Thermal probe
- 8 - Flue gas temperature probe
- 9 - Mixer
- 10 - Condensate pumping station (optional equipment)
- 11 - Hydroblock
- 12 - Condensing body

- A - Input for gas
- B - Input for returned water
- C - Output for heating water
- D - Input for additional filling



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)

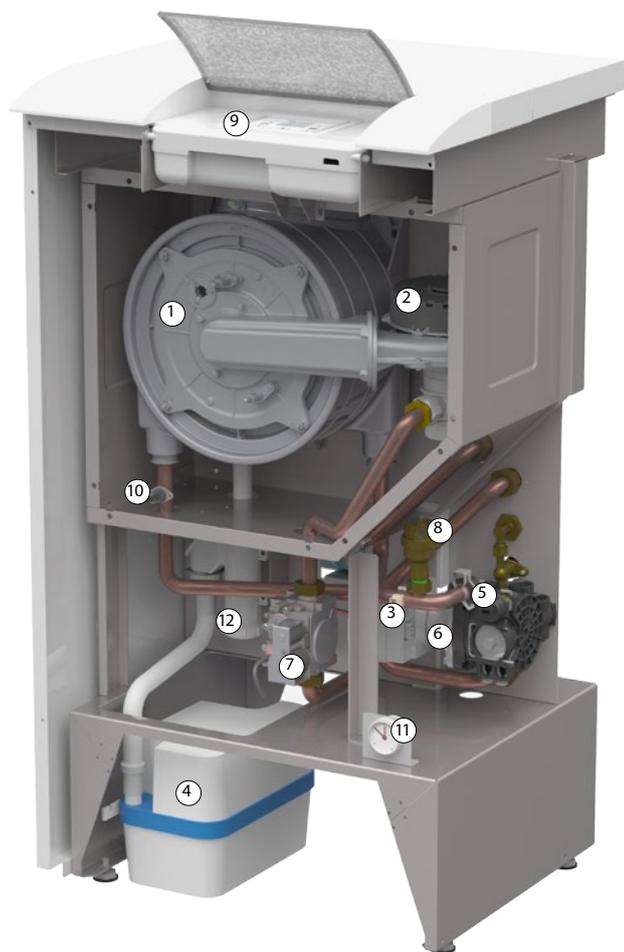
In the case of a consumer appliance fire

- 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 24 KDNS	
Fuel		-	natural gas	propane
Consumer appliance category		-	I _{2H} , II _{2H3P}	I _{3P} , II _{2H3P}
Nominal thermal input for heating Q _n		kW	24.5	24.5
Minimal thermal input for heating Q _n		kW	4.6	4.6
Nominal thermal output for heating P _n		Δt = 80/60 °C	24.0	24.0
		Δt = 50/30 °C	26.0	26.0
Nominal thermal input for heating DHW Q _{nw}		kW	24.5	24.5
Nominal thermal output for heating DHW		kW	24.0	24.0
Minimal thermal output P _n		Δt = 50/30 °C	4.7	4.7
		Δt = 80/60 °C	4.5	4.5
Drilling gas curtains		mm	5.9	4.3
Gas overpressure on the consumer appliance input		mbar	20	37 (50)
Consumption of gas		m ³ .h ⁻¹	0,46 – 2,70	0,20 – 1,03
Maximum overpressure of heating system PMS		bar	3	3
Minimum overpressure of heating system		bar	0.8	0.8
Max. output temperature of heating water		°C	80	80
Flue-gas installation alternatives		mm	80/125, 2x 80	
Average temperature of burnt gases		°C	64	64
Flue gas temperature in case of overheating		°C	75	75
Lowest flue gas temperature at min. heating output		°C	46	46
Weight flow of burnt gases		g.s ⁻¹	2,3 – 10,1	2,3 – 9,4
Acoustic performance level		dB (A)	52	52
Boiler efficiency		%	98 – 107	98 – 107
NOx class of boiler		-	6	6
Type of electricity supply		-	~	~
Nominal supply voltage / frequency		V / Hz	230 / 50	230 / 50
Auxiliary electricity at		nominal heat input power	W	70.0
		partial loading	W	55.0
		emergency status	W	4.0
Nominal current of the circuit breaker for consumer appliance		A	2	2
Level of coverage of electrical part		-	IP 41 (D)	IP 41 (D)
Environment according to ČSN 33 20 00 – 3		-	basic AA5 / AB5	
Volume of expansion unit		l	7	7
Filling overpressure of expansion vessels		bar	1	1
Dimensions of boiler: height / width / depth		mm	935 / 510 / 458	
Weight of boiler		kg	33	33

1.5 Set of boiler



THERM 24 KDNS

- 1 - Condensing body
- 2 - Ventilator
- 3 - Heating temperature probe
- 4 - Condensate pumping station (optional equipment)
- 5 - Pressure sensor
- 6 - Circulation pump
- 7 - Gas valve
- 8 - De-aerating valve
- 9 - Control panel
- 10 - Emergency thermostat
- 11 - Manometer
- 12 - Gulley trap (siphon)

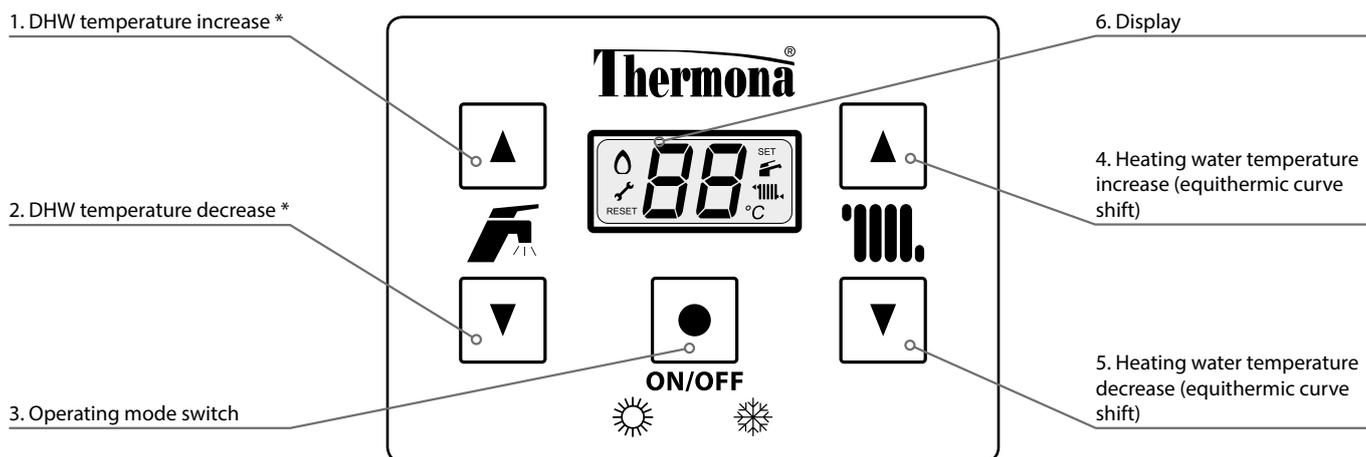
2. USER MANUAL

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 boiler control panel is integrated into the top boiler cover, which makes the individual control elements ideally accessible.



* Only used when an external DHW storage tank is installed.

2.1.2 Description of the boiler panel controls

● Operating mode switch - function

Boiler shut-down (standby) – the protective functions of the boiler remain in operation (when the boiler is connected to the electricity network and the gas supply is opened). The selection of the mode is indicated by "--", heating and DHW heating are disconnected. The boiler is disconnected by pressing down the button ● for 5 s



Starting the boiler – is done by pressing down the button ● for about 2 s. The boiler starts in the winter mode. When summer mode is required, press down the button again ● for 2 s



❄ **Winter mode** – active heating and heating of DHW



☀ **Summer mode** – active only heating of DHW, heating is OFF



RESET **Resetting the fault conditions of the boiler** – it is done by pressing down the button ●



Setting the heating temperature – setting of the output temperature of water in the heating system within the range 25 – 80 °C. In the case of selected equitherm regulation, the shift in the heating curve is set by the control indicators (within the range ± 15 °C from the selected equithermic curve)



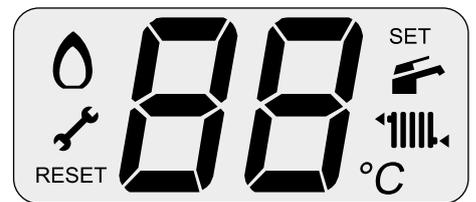
Setting DHW temperature – setting the required hot water temperature between 35 to 60 °C. Only used when an external DHW storage tank is installed. When DHW temperature is read in the storage tank using a thermostat (ON/OFF), it is used for setting the required heating water temperature that heats up the storage tank

DHW heating shut-down – the DHW heating can be permanently shut down by setting the required DHW temperature at “0”. DHW heating is activated again by setting the required DHW temperature.

LCD display – displaying the operating parameters of the boiler

Indication of set temperature

After pressing the buttons for setting the temperature of the heating system or DHW, the respective symbol of the mode 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 mode is indicated again



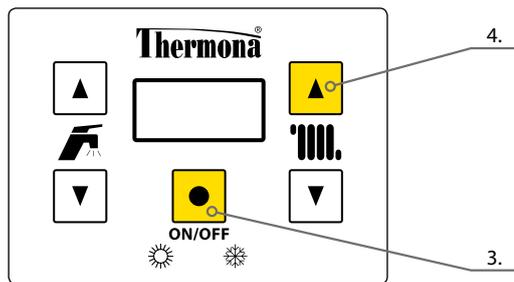
Description of symbols shown on the display

SYMBOL	MEANING
00	The field for displaying temperatures, fault conditions, service values and other data
	Constantly lit - the boiler is in summer mode - displays the primary circuit temperature Flashing – displays the DHW temperature or the requested DHW temperature by setting
	Constantly lit – the boiler is in winter mode Flashing – displays the heating temperature or the required heating temperature during the setting
	Constantly lit - the burner is working Flashing - the burner is being activated
	Flashing - the boiler requires service
SET	Flashing (every 4 s) - active communication of OpenTherm with a superior regulator
	Flashing alternately - the boiler is off (standby)

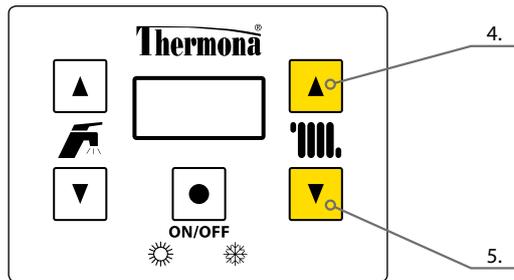
SYMBOL	MEANING
UU	Active anti-cycling function
Po	Active pump run-out function
bP	Active anti-freeze boiler protection function
FL	Request for refilling the heating system
Er	Boiler error - flashing alternately with an error code
th	Forced heating function
RESET	Boiler reset required

2.1.3 Information menu

It is used for displaying the current boiler parameters and other available information.



The menu is entered by shortly pressing button 3 and 4 at the same time.



Move in the menu by using button 4 and 5.

The information menu closes automatically when inactive for 60 s. The menu can be immediately closed by shortly pressing button 3 and 4 at the same time.

List of displayed information parameters

DISPLAY	MEANING
d0	Heating system pressure (/10)
d1	Outside temperature (1)
d2	Equithermic curve (factor „K“)
d3	Equithermic curve shift
d4	Required temperature of heating water
d5	Measured temperature of heating water

DISPLAY	MEANING
d6	Temperature of return water
d7	DHW temperature
d8	Flue gas temperature
d9	Fan speed (x100)

(1) - an outdoor temperature display is only available in the case of the correction of the outside sensor and the selection of equithermic regulation

2.1.4 Error messages

Any error or other anomaly is indicated by flashing of the backlit LCD display. The following is lit on the display symbol  or RESET and this flashes alternately **Er** and the error code with description according to the table.

Error code displayed on the LCD screen and its meaning

ERROR CODE	MEANING	ERROR CODE	MEANING
Er 01 *	Activity blocked after the burner did not ignite (5x without ionisation detection)	Er 13	Defect of the thermal probe of burnt gases
Er 02	Low pressure of heating water	Er 14	Quick increase in heating water temperature (> 4 °C / s), or high heating water temperature (> 105 °C)
Er 03	Indication of false flame	Er 16 *	High temperature of burnt gases in the condensing body
Er 04	Defect in thermal heating probe (interruption of short-circuit)	Er 21	Defect of the thermal probe of return water
Er 05	Defect to the thermal DHW probe	Er 25 *	Repeated loss of flame (3x) during the burner's operation (after ionisation detection)
Er 06 *	Blocking of activity after overheating of the boiler (emergency thermostat)	Er 69	Error in the connection of the heating water pressure sensor
Er 07	Defect to the outside temperature sensor	Er 99	Controlling automatics configuration error
Er 08	Fan control failure	Li 01	High heating temperature when heating DHW
Er 11 *	Blocking - unspecified error		

* The boiler is blocked. To reactivate the boiler, manually reset by pressing the button .

The error code is saved into the memory of the processor where it is also saved in the case of a supply failure. The service technician can check the memory and ascertain the history of failure statuses.

2.2 Commissioning of the boiler to operation

! 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 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

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

- insert the network supply into the socket and switch on the boiler with the switch for operating modes
- inspect the correct activity of all thermostats and control elements
- inspect all functions of the boiler
- adjust the burning of the boiler using the burnt gas analyser, or modify the setting according to demands of the area to be heated and the character of gas collection
- 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 thermostat or another safety element excluded from 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!

2.3 Disconnection of the boiler from operation

It is possible to disconnect the boiler for a shorter period by the operating mode switch, or using superior regulation.

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.

2.4 Regulation

The boiler is fitted with internal regulating elements at a high level for such basic equipment. Integrated equithermic regulation is provided as standard. The heating in the heating system can be controlled in several ways: regulation of the room temperature in a selected reference room; equithermic regulation of heating water, regulation according to the boiler temperature etc.

2.4.1 Operation of the boiler without the room thermostat or regulator

In this mode 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 mode, set the temperature of the heating water directly on the boiler control panel with the button 4 and 5.



The operation of the independent boiler (without selection of equithermic 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 modes. It is recommended to use the built-in equitherm regulation either independently or completed by the spatial regulation, as mentioned below.

2.4.2 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 connection of the terminal labelled as RT inside the control panel of the boiler. 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).



For control according to room temperature, Thermona delivers and recommends the whole series of room thermostats: e.g. THERM Home S, THERM Home SR (wireless version), BT52 WiFi 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 mode

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 mode control knob is in the winter mode 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 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 button on the control panel (within the range 25 – 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 turning off of the space thermostat or switching the boiler to the "SUMMER" mode, the burner is stopped and the pump is further turned on for a set time of the pump run-out function. 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 or regulator 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.

2.4.3 Operation of the boiler using built-in equithermic regulation

This mode is accessible in the boiler in the standard variant but it 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 equithermic 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 mode

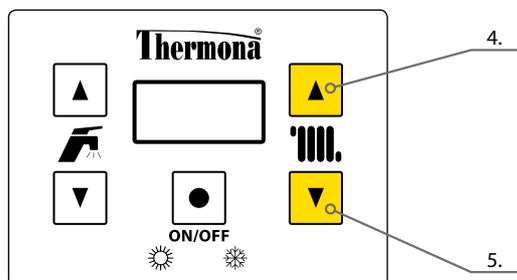
The working phases of the boiler are identical with the previous mode with the difference that the temperature for the heating system is automatically set according to the outside temperature (ascertained by the sensor). The calculation of the requested temperature of the heating system is the function of the ambient temperature and the function of the "K" factor (declination of equithermic curve), which is set by the service technician with respect to the locality and nature of the object and the heating system. Using the buttons for setting the heating water temperature on the control panel, the user sets the requested thermal comfort (correction of the equithermic curve shift within the range $\pm 15\text{ }^{\circ}\text{C}$ of the heating water). In the case of failure of the ambient temperature sensor, this status is signalled by Er 07 failure and the boiler continues in operation with the temperature of the heating system according to the setting in the previous mode (without equithermic regulation).

Adjustment procedure

When setting the equithermic regulation, it is necessary to distinguish the **declination** and the **shift** of the equithermic curve. When setting **the declination** of the equithermic curve, 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 equithermic regulation the meaning of the function of the button 4 and 5 on the control panel of the boiler is changed. In this case, the mentioned buttons is used to set the shift of the heating curve (within the range $\pm 15\text{ }^{\circ}\text{C}$ from the equithermic curve set by the service technician).

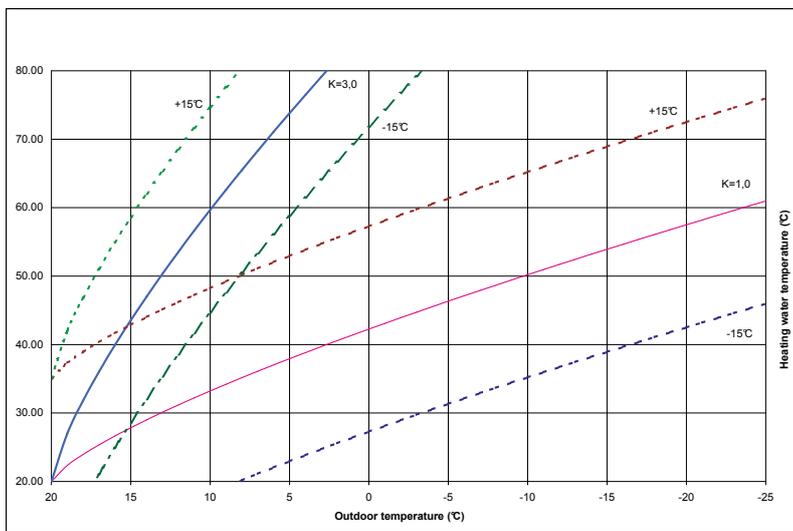
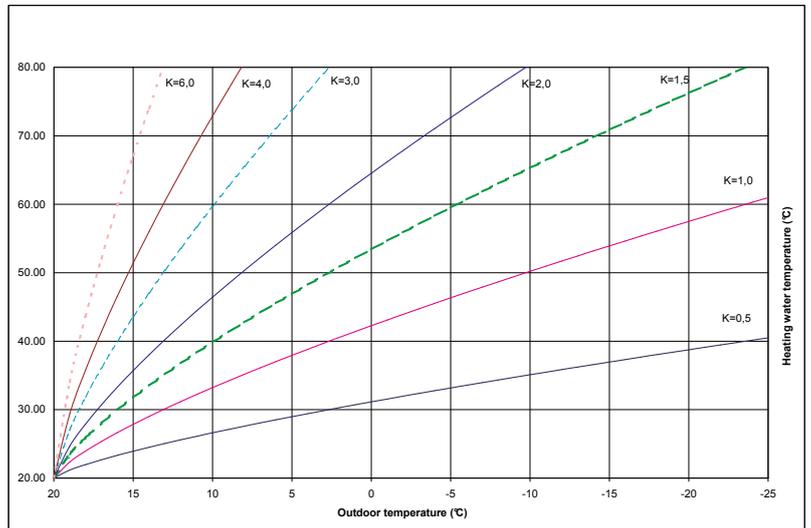


Shift the equithermic curve using buttons 4 and 5.

It results from the mentioned facts that using the button to set the temperature of the heating on the control panel in this mode indirectly sets the requested temperature of the space to be heated. At the beginning (in the production) the equithermic curve is set at "K" = 1.6. 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 equithermic 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 mode 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 equithermic curves (zero shift)



Example of the course of selected curves during correction of the shift

2.4.4 Operation of the boiler using master equithermic regulation

After ensuring “full value” equithermic 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 mode, 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 add-in regulators are not (with the exception of short-term special offers) included in the delivery of the boiler!

2.4.5 Heating of utility water (DHW)

THERM 24 KDNS boilers may be used, when the required additional equipment is installed, for heating water in an external indirect-heating storage tank.

DHW HEATING ACTIVITY DESCRIPTION

The operating phase of DHW storage tank heating starts when the storage tank sensor or thermostat detects a decreased DHW temperature. The pump is activated after the three-way valve is readjusted (within the time interval of 8 seconds). After the sequence for the inspection of security elements, the ignition of the burner is enabled.

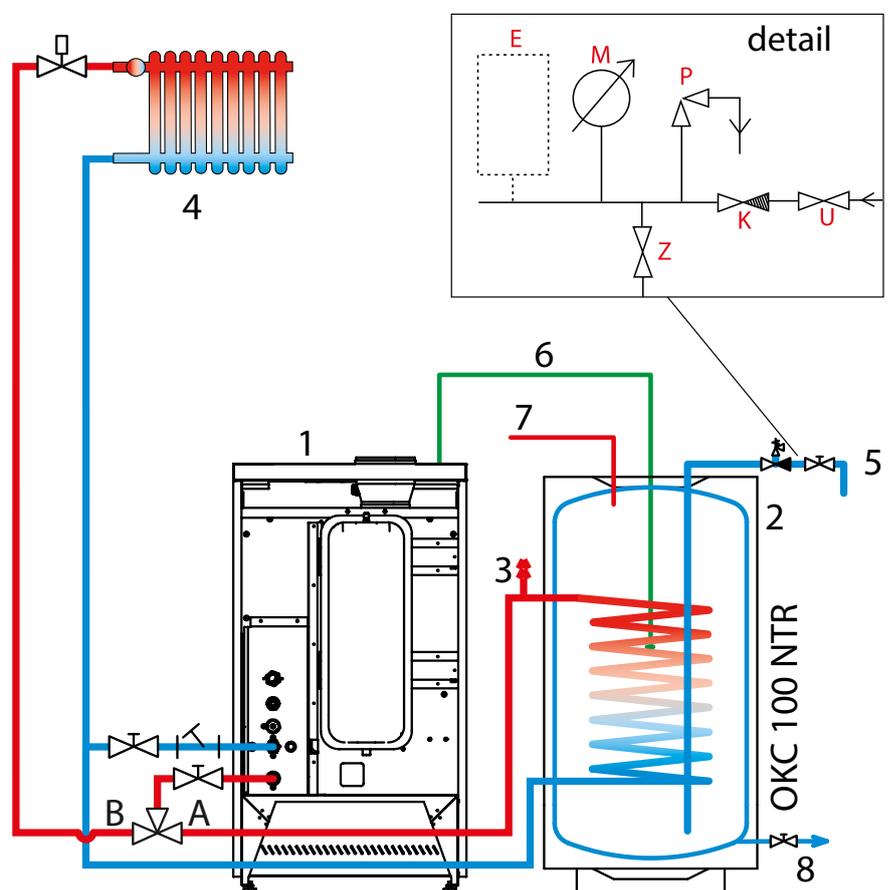
From detecting the presence of the flame, the starting output of the boiler is kept for 2 seconds and then there is the phase of fluent modulation of the output with PID regulation with the stated value of the temperature of heating of 80 °C (unless reduced). During the whole time of heating, the regulation limit of the output temperature is checked. The operating phase in the DHW heating mode ends when the required DHW temperature is reached.

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. After termination and stopping of the pump, there is switching of the three-way valve and resetting is activated. Then the requested heating of the heating system can be run.

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

- 1 – Gas boiler THERM 24 KDNS
- 2 – Indirect heating storage tank
- 3 – Air release valve
- 4 – Heating system
- 5 – Supply of cold water
- 6 – Connection of the thermostat for the storage tank
- 7 – Output DHW
- 8 – Discharging valve

- U – Closure on the cold water inlet
- Z – Testing valve
- K – Return valve
- P – Safety valve
- M – Pressure meter
- E – Expansion tank (recommended)



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

2.5 Selected protective and additional functions of the boiler

! Notification: All the above-mentioned security and protective functions, including the anti-freeze boiler protection, are only active when the boiler is connected to the electricity!

Anti-blocking functions

After 24 hours of inactivity, the pump runs for 30 seconds to prevent any blocking. 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 boiler protection

The boiler is equipped with anti-freeze protection system that protects it from 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 15 °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 also active in the position "OFF" or in the "SUMMER MODE".

Storage tank anti-freeze protection (only when DHW temperature is read by a 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 protection of the storage tank is activated when DHW temperature in the storage tank decreases below 8 °C. The pump is activated, the boiler is ignited and the storage tank is heated until the temperature of 10 °C is reached.

! The anti-freeze storage tank protection is not active in the standby mode - the display shows "- -".

Anti-cycling

The function that prevents the cycling of the boiler in the heating mode when re-ignition of the boiler is not permitted in the case of operating boiler shut-down before the expiration of the adjusted, anti-cycling time (5 minutes are set in the production). 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 010 minutes can be only be changed by an authorized service technician!

Run-out of the pump

When the request for heating or DHW heating ends, the pump continues to operate during the adjusted run-out of the pump. The factory setting of the pump run-out is 1 minute after the end of heating, and also 1 minute after the end of DHW heating. When the boiler is operated without the room thermostat in the winter mode, the pump continues to be ON.

! The pump run-out time within the range 0 - 10 minutes can be only be changed by an authorized service technician.

Run-out of the ventilator

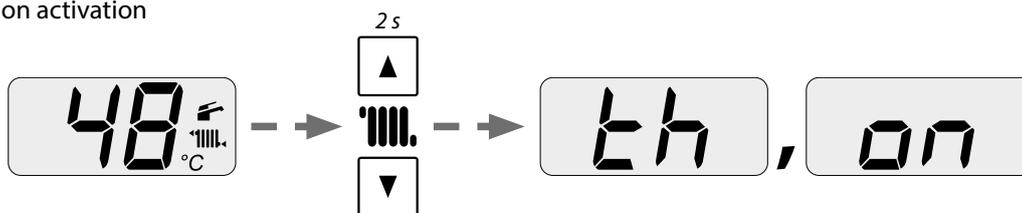
After termination of burning, the ventilator is in operation for 30 seconds while keeping the revolutions corresponding to the starting output (taking the remaining of burnt gases from the combustion chamber).

Anti-Legionella function (only when DHW temperature is read by a sensor)

The function is activated at the moment when the DHW temperature in the storage tanks drops below the set limit temperature and does not exceed it during a measured time interval (two or three days). When activated, the storage tank is automatically heated to 60 °C, then the function is deactivated. The default setting of the function is OFF, it may be activated in the service menu of the boiler.

Forced heating function – it allows for manual activation or deactivation of heating for a period of 24 hours.

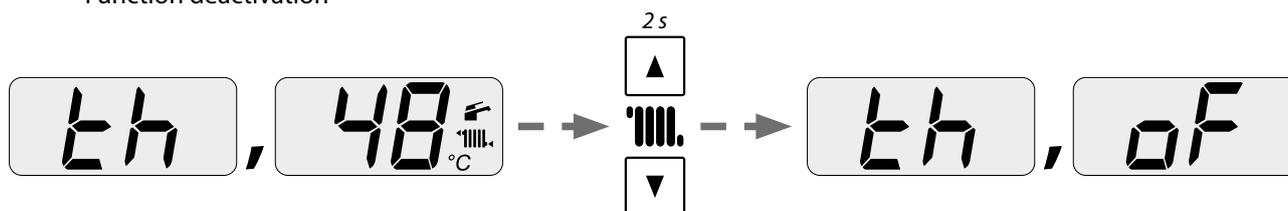
Function activation



When activated, the display shows the function symbol “th” and the current heating water temperature alternately. The function is automatically deactivated after the lapse of 24 hours.

For immediate deactivation, follow this procedure:

Function deactivation

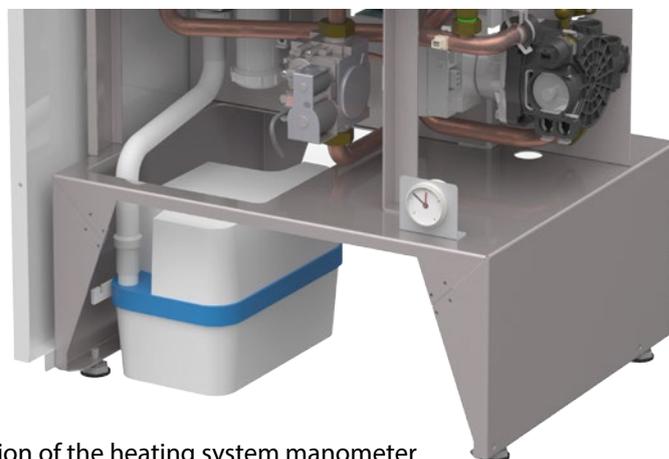


With respect to the request for increased checking of the microprocessor once every 24 hours of operation, the forced reset of electronic system is performed with the consequent initialization (it is reflected by short-term interruption of the boiler and deactivation of data on the display similarly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

2.6 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 combustion, etc.

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 current heating system manometer be read in the information menu of the boiler or the pressure gauge, located under the boiler casing.



Location of the heating system manometer

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.

2.6.1 Additionally filling the heating system

Additional filling into the heating system (additional pressurizing of the system) can be done through the filling valve which is directly integrated on the boiler. Water for filling must fulfil certain parameters, see chapter 3.8.

Manometer – displays the measured water pressure in the heating system

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. Disconnect the boiler from electrical voltage
2. Remove the front cover of the boiler casing by pulling lightly
3. Slowly open the valve for additional filling with your hand and monitor the manometer on the bottom of the boiler
4. Set the system pressure to the necessary value (according to the heating system, recommended 1.0 – 1.5 bar)
5. Close the valve for additional filling
6. Connect the boiler to the electricity network and connect the boiler again



2.7 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

Stationary condensing boilers THERM 25 KDNS series are designed for operation in standard 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 ČSN EN 1775, ČSN 38 6462, ČSN 33 2000 – 7 – 701 ed.2, ČSN 06 1008, ČSN 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

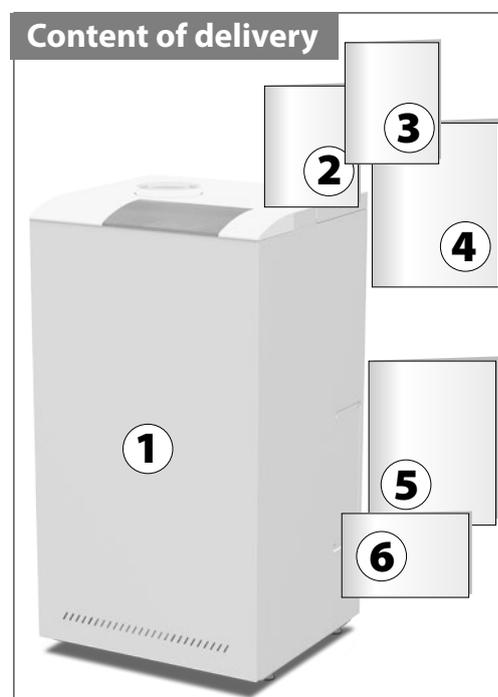
- the type of the boiler corresponds to the ordered boiler
- the selection of the boiler is correct for the stated use (type of gas, heating system, collection of smoke, air suction)
- the delivery is complete

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. Warranty certificate (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)



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.

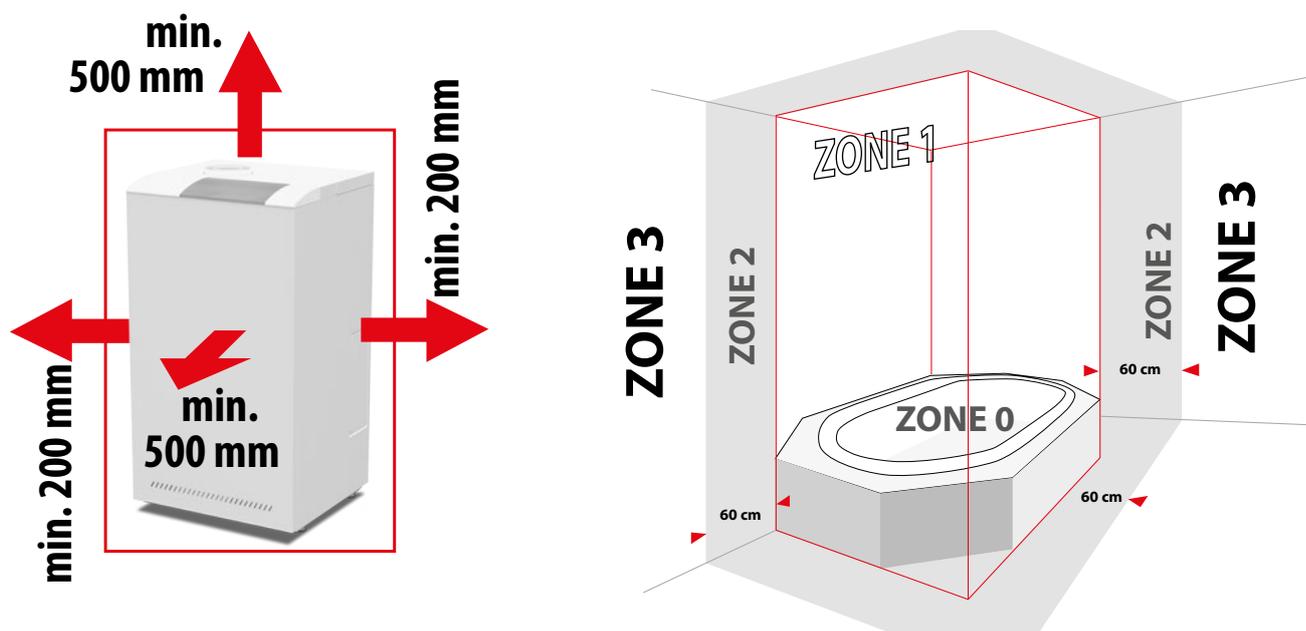
In the case of any doubt or inquiries, contact the producer or supplier before assembly.

3.3 Location of the boiler

The condensing boilers THERM can be installed in the basic AA5/AB5 environment according to ČSN 33 2000-3 and ČSN 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.

Boilers can be installed in residential and non-residential premises (the noise fulfils Ministry of Health Regulation No.13/1977 Coll.).

The stationary condensing boilers THERM **must not be** installed in premises with bath-tubs, bathrooms, washing areas and special zones 0, 1 and 2 according to ČSN 33 2000-7-701 ed. 2: 2007 and in washing area according to ČSN 33 2130 ed.2: 2009. The coverage of electrical parts is IP 41 (D) and fulfils the conditions for resistance against vertically dropping water – possible location also in premises with wash-tubs or shower in zone 3 again according to ČSN 33 2000-7-701 ed.2: 2007. If the boiler is installed in the respective zones, additional protection must be implemented – additional protective connection of all conductive parts according to Article 701.415.2 ČSN 33 2000-7-701 ed.2: 2007 and Article 415.2 ČSN 33 2000-4-41 ed.2: 2007. 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 shown in the following diagrams.



Notice

Items pursuant to ČSN 06 1008 must not be located near the contour of the boiler (classified according to ČSN 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.

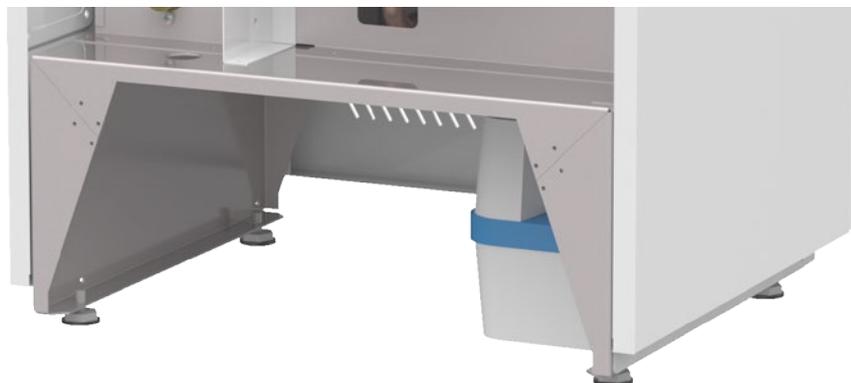
Before starting work that may cause a change of the environment in the area of the installed boiler (e.g. work with painting substances, glues, etc.), it is necessary to disconnect the boiler using the mode switch and to disconnect it from the electricity network (remove the network fork from the socket).

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 Installation of the boiler

THERM 24 KDNS stationary condensing boilers are installed on a load-bearing floor without significant unevenness. Minor floor unevenness can be compensated using the adjustable feet. The adjustable feet provide optimal height levelling while maintaining high stability.

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.

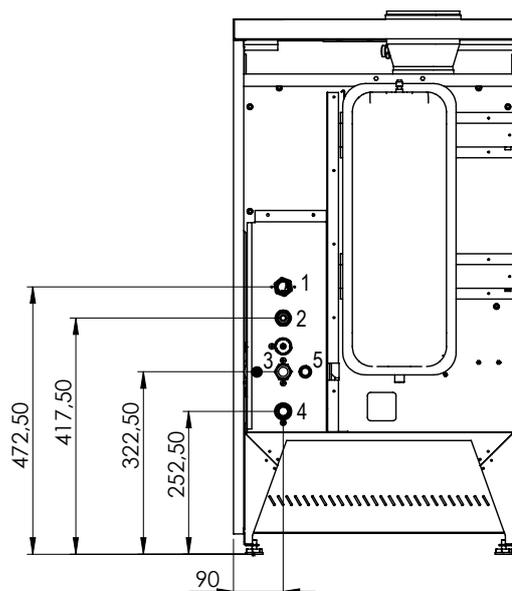
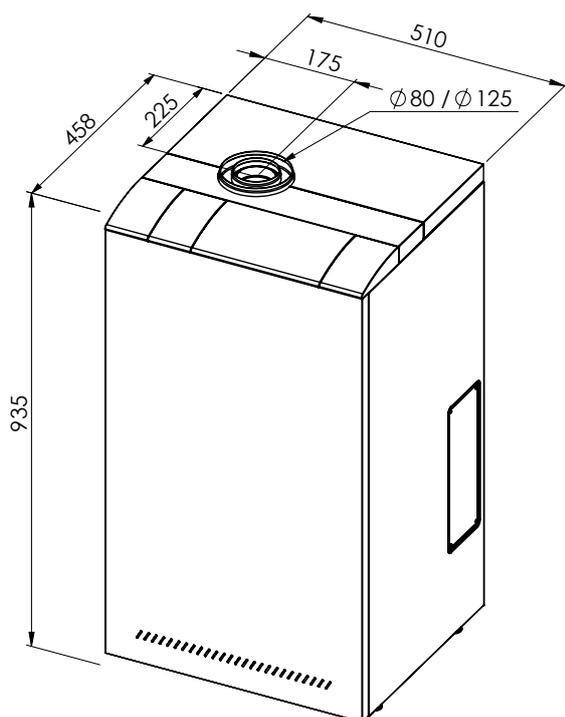


3.5 Connecting the boiler to the hot-water system

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 mode 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 – 2.0 bar.

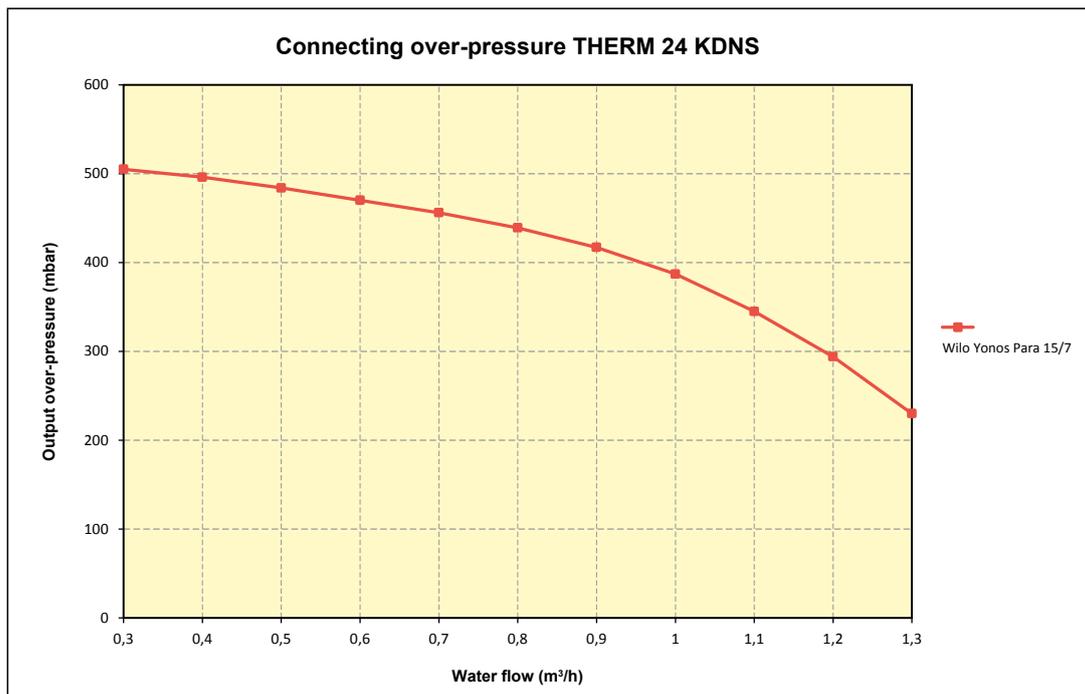
3.5.1 Dimensions and connection



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

3.5.2 Graphs of the connecting overpressure of heating water (on the output for heating water)

Notification: The curves of the connecting over-pressures of heating water are designed for **Wilo Yonos PARA 15/7** pumps for the outside regulation stage.



! 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 ČSN 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 with magnet. It is necessary to clean and inspect the filter and sludge separator in regular intervals.

The heating system must be implemented in accordance with ČSN 06 0830 – Heating systems in buildings – Security equipment and with ČSN 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

💡 The producer recommends

- to fill the system with soft water according to ČSN 07 7401
- to separate the boiler on the input and output with a stop valve (see ČSN 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 condensing boilers are fitted as standard with the integrated expansion vessel for the heating system with the volume of 7l. The volume of the expansion tank is in most CASE, sufficient to cover the expansion of heating water in standard heating systems with plate heating bodies. In some older heating systems with a large volume of heating water, it is necessary to mount an additional expansion vessel.

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 designed for operation with natural gas with the heating capacity 9 – 10,5 kWh/m³ and the nominal pressure in the 20 mbar distribution network and also (after necessary modifications) with propane with nominal pressure in the 37 mbar distribution network.

3.6.1 Conversion to other fuels

When changing the gas during the reconstruction of the boiler, the gas curtain, which is located in the threading between the gas output from the gas fitting and the mixer must be changed. In addition, it is necessary to inspect or change the setting the respective parallel mixing parameters on the gas fitting. The volume of CO₂ in burnt gases is set within the minimum and maximum range of the output of the boiler according to the burnt gas analysers.

These activities must only be carried out by a trained service employee authorised by the manufacturer. After the adjustment of the boiler, the units for the default setting must be secured against unauthorized intervention. The manufacturer is not liable for any damage caused by unqualified setting.

! 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 ČSN 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. After filling the heating system, the pressure should be within the range 1.0 – 1.5 bar
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, automatic de-aerating valves in the boiler will remain slightly opened!

If these requirements are not fulfilled, the warranty for damaged components will no 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 100 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
NO ₂	mg.l ⁻¹	< 0,01
Copper (Cu)	mg.l ⁻¹	< 0,13
Lead (Pb)	mg.l ⁻¹	< 0,0066
Cadmium (Cd)	mg.l ⁻¹	< 0,0001
Zinc (Zn)	mg.l ⁻¹	0.253

Pointer	Value
pH	4.1

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 ČSN 734201. 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.

A connecting flange is installed at the point of the flue outlet and combustion air inlet in the top part of the boiler. The flange must stay in the installation. Otherwise, no correct connection of the following flue is provided and the safe and reliable operation of the boiler may be affected.

For THERM condensing boilers, the following methods for the collection of burnt gases are approved

- a) coaxial smoke collection tube with a diameter of 60/100 mm
- b) coaxial smoke collection tube with a diameter of 80/125 mm
- c) separate smoke collection tube with a diameter of 2 x 80 mm
- d) flexible system of smoke collection tube with a diameter 80 or 100 mm

Permitted maximum lengths of smoke collection tube

Diameter of the smoke collection tube	Max. length - horizontally	Max. length - vertically
80/125 mm	11 m	11 m
2 x 80 mm	11 m + 11 m (suction + exhaust)	11 m + 11 m (suction + exhaust)
Flex 80 mm	11 m + 11 m (suction + exhaust)	11 m + 11 m (suction + exhaust)

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:

0,5 m - knee 45°

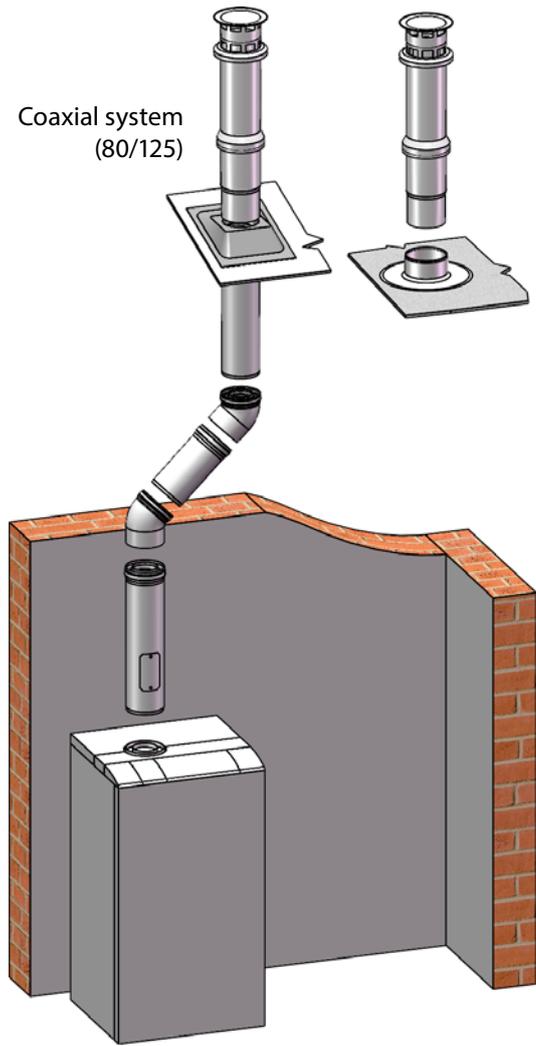
0,75 m - knee 90°



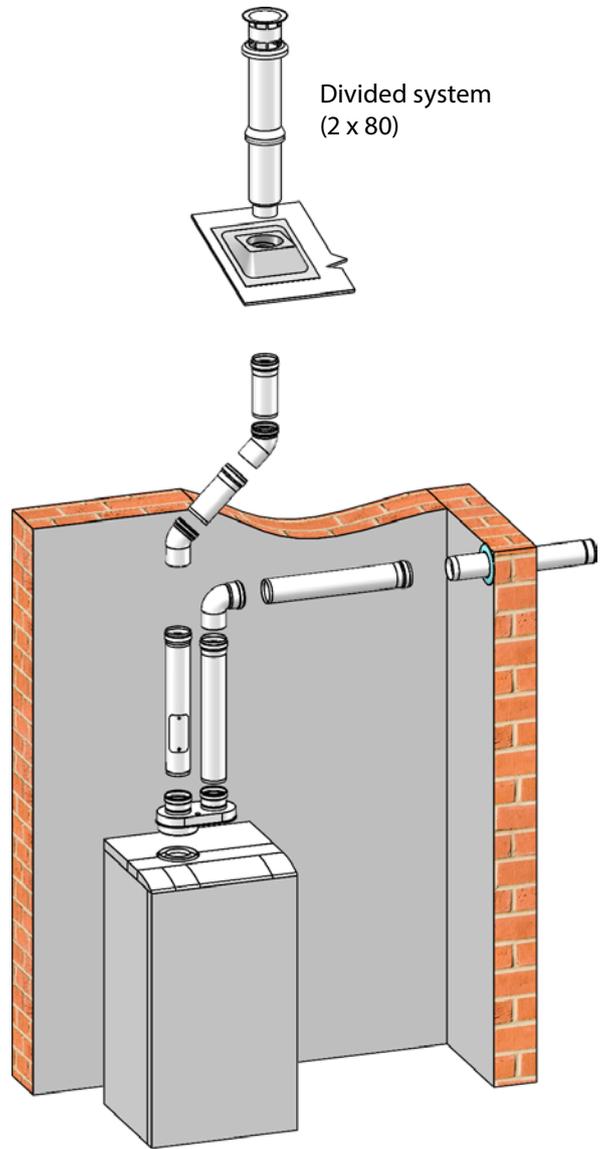
The maximum total pressure loss of gas collection is 95 Pa.

Example of gas collection

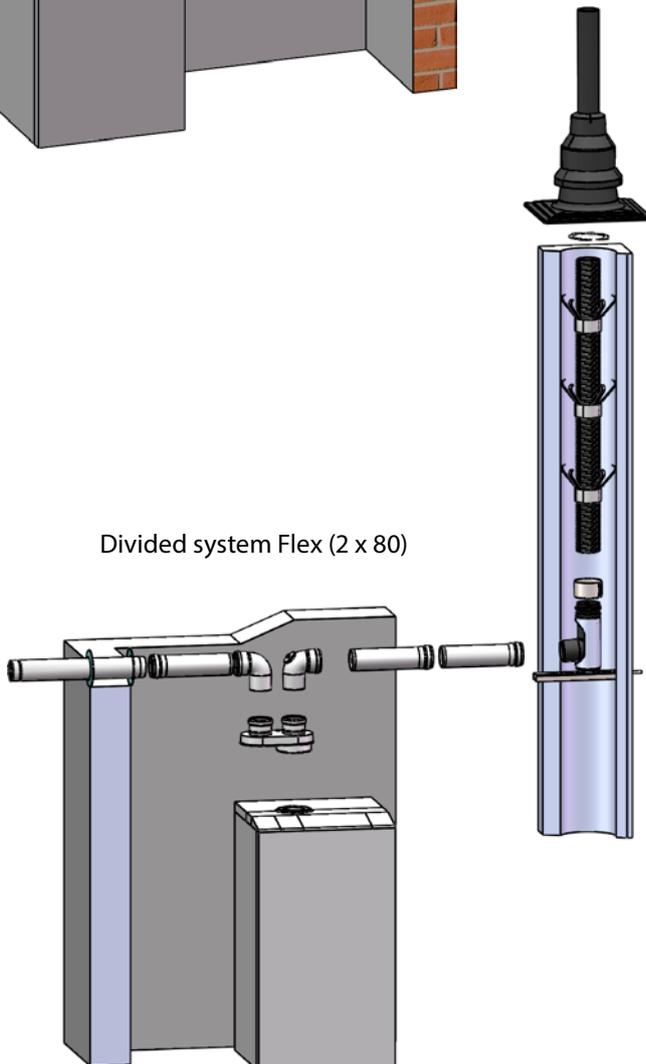
Coaxial system
(80/125)



Divided system
(2 x 80)



Divided system Flex (2 x 80)



3.10 Connection of the boiler to the storage tank

THERM 24 KDNS boiler (after expansion by a three-way valve) can efficiently and reliably resolve heating water together with the heating system. A detailed description of the water heating is in Chapter 2.4.5.



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.

Example of a connection of the OKC 125 NTR indirect-heating storage tank to the THERM 24 KDNS gas boiler



- A - Input for returned water
- B - Output for heating water
- C - Hot water circulation inlet
- D - Cold water inlet
- E - Output DHW

3.11 Connection of the boiler to the electricity network

Boilers are fitted with a three-conductor supply cord with an inseparable fork according to ČSN 34 0350 ed.2: 2009. The connection to the network is performed pursuant to the requirement of Article 25.1 ČSN 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 **ČSN 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 the connection of the room thermostat for a copper conductor (wire) is from 0.5 to 1.0 mm².

The terminal board for the connection of the room thermostat is located on the connecting module inside the boiler control panel - RT terminal (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! The terminal board is accessible after removing the outside cover, tilting and consequent dismantling of the rear part of the control panel.

3.11.2 Connection of a room regulator with OpenTherm+ communication

The intelligent room regulator is connected similarly to the connection of the standard spatial thermostat - to the connecting module (OT+ terminal).

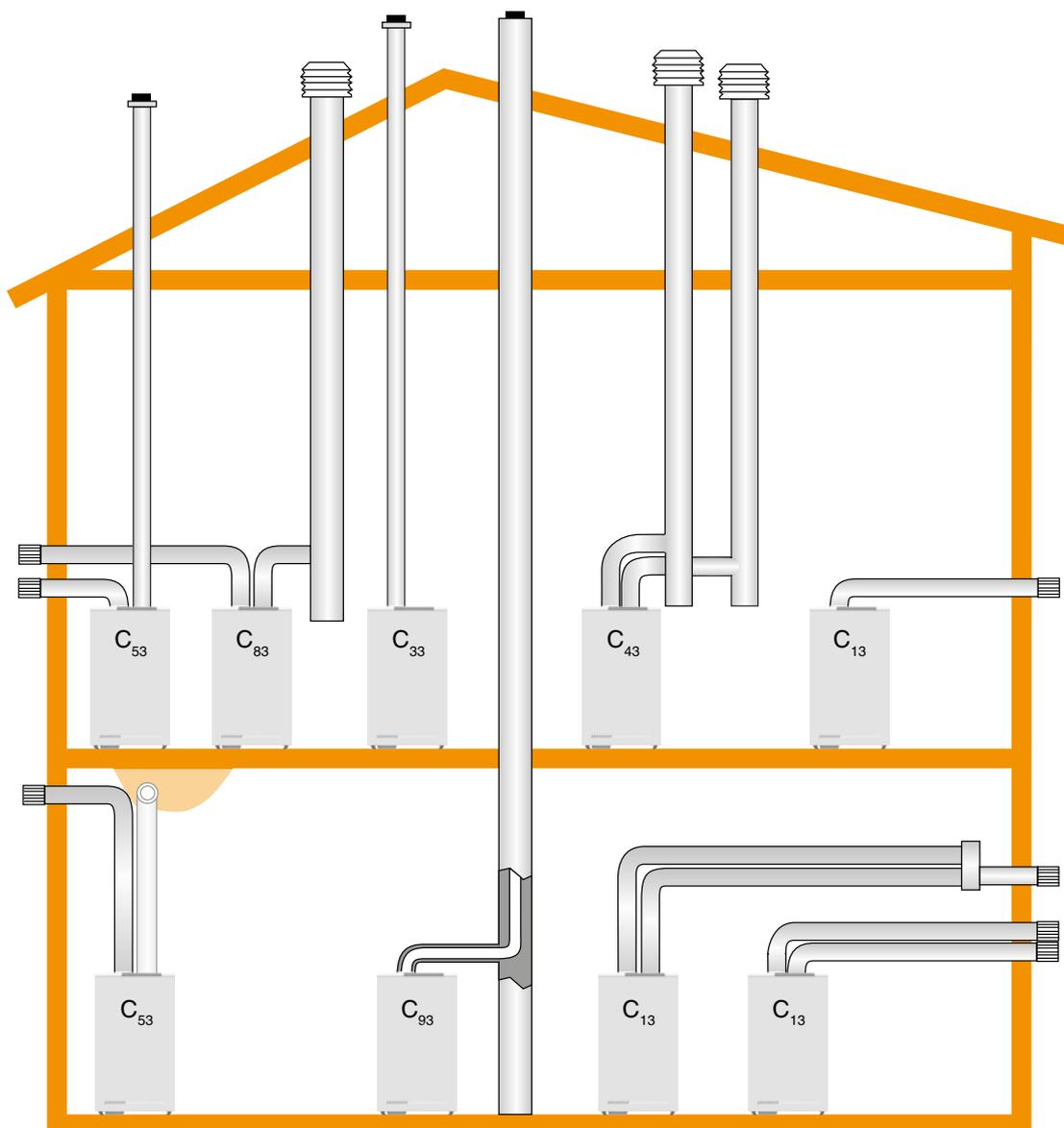
Technical recommendation during the connection of the regulator with OpenTherm+ communication with the boiler

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 Variants for the installation of the boiler



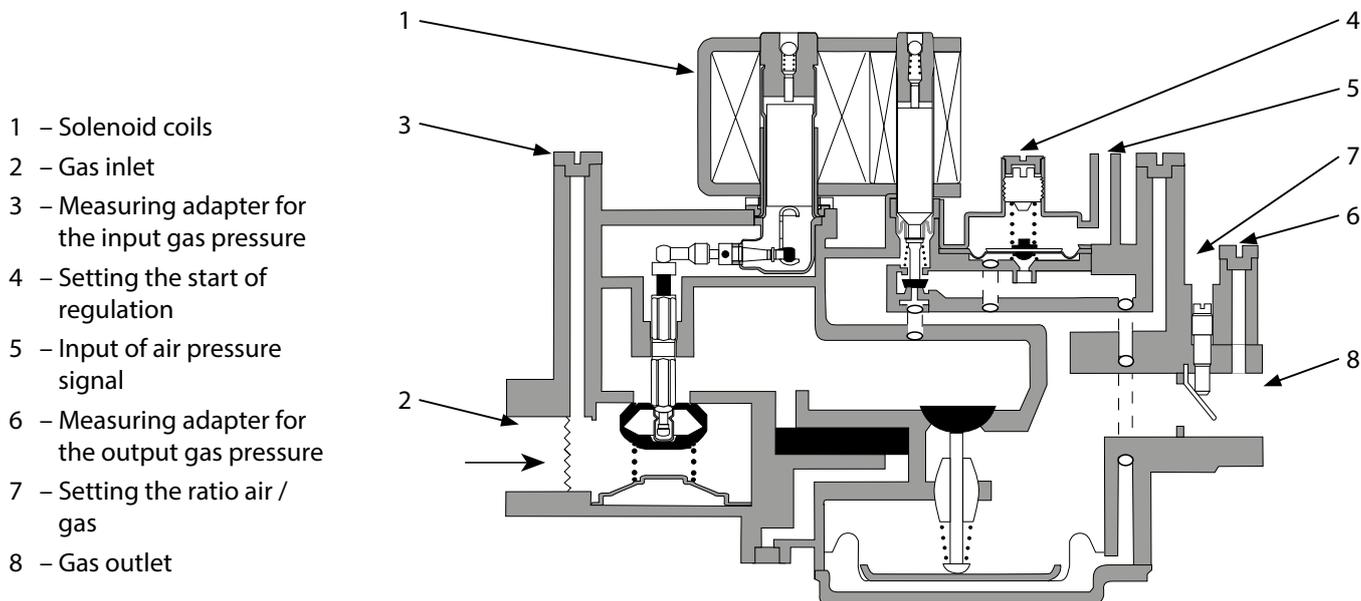
Construction:

- 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.
- C₆₃ - The protective orifices for pipes that supply combustion air and take away burnt gases must not be located on opposite walls of the building.
- 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

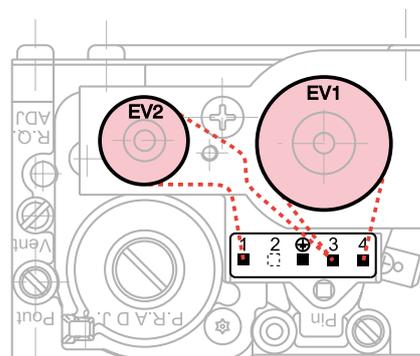
4.1 Gas fitting SIT 848 SIGMA - setting

SIT 848 SIGMA is gas fitting with the proportional regulation air / gas. It is fitted with two solenoid valves for blocking the passing gas during any inactivity of the boiler. The regulating system works depending on the feedback signal of the gas pressure from the mixer. In addition to closable measuring adapters for the input, output and medium gas pressure, there are elements for setting the correct ratio of air – gas within the whole range of the regulation of the output of the boiler.



Electrical connection of the connector for solenoid coils

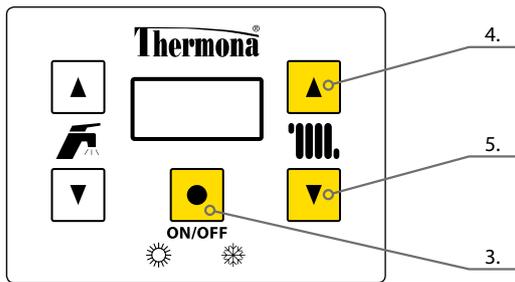
Gas fitting contains two EV1 solenoid valves (gas input solenoid) and EV2 (regulation system solenoid). Coils are connected in the connector for the connecting cable in parallel (i.e. they are connected at the same time). The supply voltage of the coils is 230 V AC (alternate).



The configuration must be secured against unauthorised use.

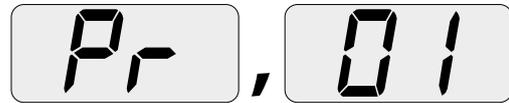
4.2 Adjusting boiler combustion

Chimneysweeper function activation



Enter the service menu by pressing down buttons 3, 4 and 5 for a period of 10 s.

The following is displayed

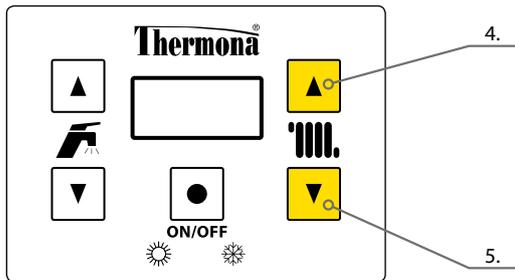


Press down buttons 4 and 5 for 2 s at the same time.

The following is displayed



The boiler is now working in the DHW heating mode at minimum output.



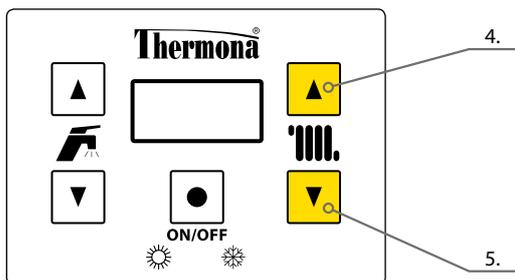
At this moment, it is possible to switch between the individual chimneysweeper function values using buttons 4 and 5 (e.g. **hP** and **dP**).



The boiler is working at maximum output



The boiler is working at minimum output



Combustion adjustment at the maximum boiler output

Set the chimneysweeper function at the value of **dP**.

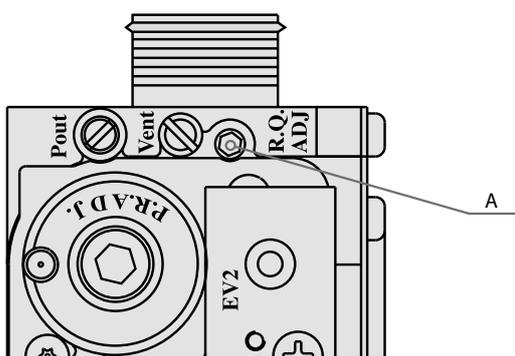
The following is displayed



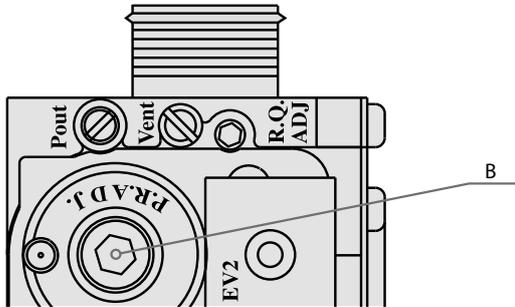
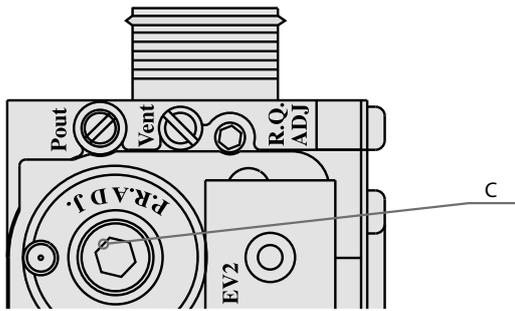
Determine the concentration of CO₂ in burnt gases using the burnt gas analyser.

The CO₂ concentration must reach the prescribed value. Correction is required in the case of a deviation from the prescribed value.

Correction is executed using Allen key no. 2.5 (position A). The CO₂ concentration decreases when turning clockwise and vice versa.

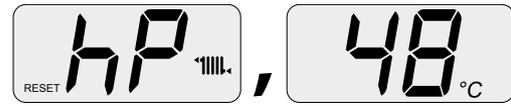


Combustion adjustment at the minimum boiler output



Set the chimneysweeper function at the value of **hP**.

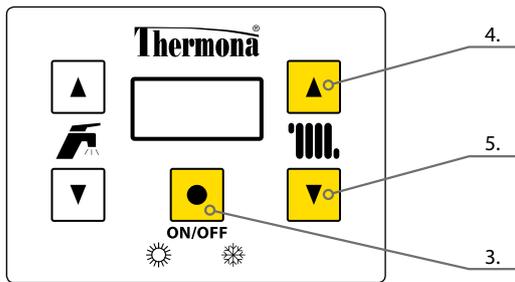
The following is displayed



Determine the concentration of CO₂ in burnt gases using the burnt gas analyser.

The CO₂ concentration must reach the prescribed value. Correction is required in the case of a deviation from the prescribed value.

Remove the cover C and use Allen key no. 4 (position B) for the correction. The CO₂ concentration increases when turning clockwise and vice versa.



Leave the service menu by pressing down buttons 3, 4 and 5 for a period of 10 s at the same time.

Prescribed setting values THERM 24 KDNS

Fuel: Natural gas H group

Screen diameter [mm]	Parameter	Parameter value	Shows on the display	Output [kW]	Fan speed [rpm]	CO ₂ [%]	O ₂ [%]
5.9	9	04	dP	26.0	5200	8,8 - 9,0	5,5 - 5,1
5.9	9	02	hP	4.7 (4.5)	1236	8,6 - 8,8	5,5 - 5,1

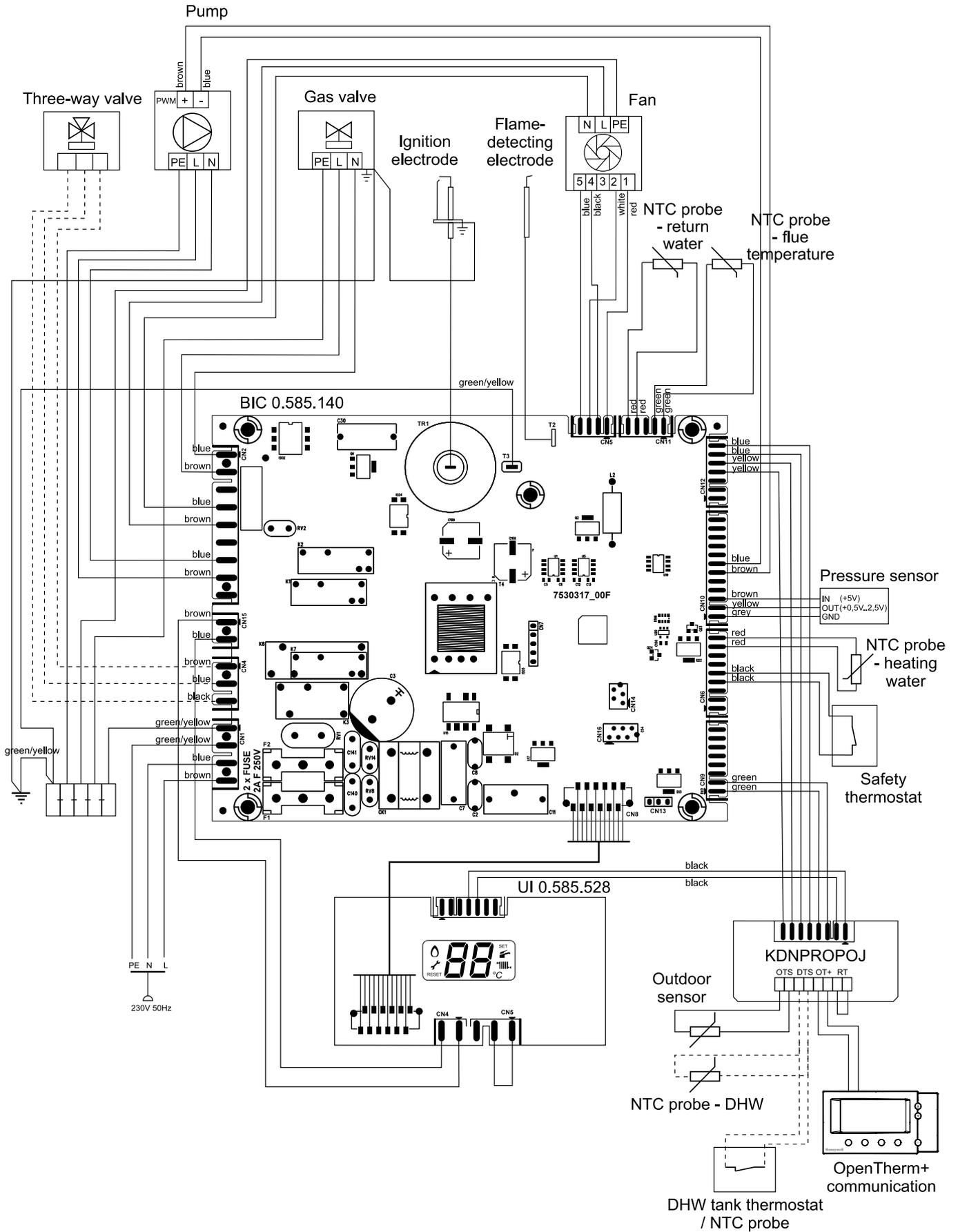
Fuel: Propane P group

Screen diameter [mm]	Parameter	Parameter value	Shows on the display	Output [kW]	Fan speed [rpm]	CO ₂ [%]	O ₂ [%]
4.3	9	04	dP	26.0	4900	10,0 - 10,2	5,6 - 5,2
4.3	9	02	hP	4.7 (4.5)	1240	9,5 - 9,7	6,3 - 6,0

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

4.3 Electrical connection diagram

THERM 24 KDNS



Product information sheet

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

Model/s: **THERM 24 KDNS**

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}	26	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	23,38	kW	At rated heat output and high-temperature regime (*)	η_4	88,26	%
At 30% of rated heat output and low-temperature regime (**)	P_1	4,70	kW	At 30% of rated heat output and low-temperature regime (**)	η_1	96,35	%
Auxiliary electricity consumption				Other items			
At full load	el_{max}	0,070	kW	Standby heat loss	P_{stby}	0,076	kW
At part load	el_{min}	0,055	kW	Ignition burner power consumption	P_{ign}		kW
In standby mode	P_{SB}	0,004	kW	Emissions of nitrogen oxides	NO_x	29	mg/kWh
				Sound power level, indoors	L_{WA}	52	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 writing notes.

7. CERTIFICATE OF QUALITY AND COMPLETENESS OF THE PRODUCT

THERM gas condensing boilers

Indication of model: **THERM 24 KDNS**



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 s.p., EC notified body, identification number 202.

The following certificates have been issued for THERM 24 KDNS boilers: 1015-GAR-02143-19, 1015-BED-02144-19, LVD-B-02145-19, EMC-B-02146-19, B-02147-19, B-02148-19.

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 _{63'} , C _{83'} C ₉₃
HU		25	-	
DE, LU, PL, RO	I _{2E}	20	-	
AT, BE, CH, CZ, ES, FR, GB, GR, HR, IE, IT, LT, NL, PL, PT, RO, SI, SK, TR	I _{3P}	-	37	
AT, BE, CH, CZ, DE, ES, FR, GB, GR, HR, IE, IT, LT, NL, PL, PT, RO, SI, SK, TR		-	50	
AT, CH, CZ, ES, FR, GB, GR, HR, IE, IT, LT, PT, RO, SI, SK	II _{2H3P}	20	37	
AT, CH, CZ, ES, FR, GB, GR, HR, IE, IT, LT, PT, RO, SI, SK		20	50	

Technical inspection

date:

seal and signature:

everything we do warms

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12/2022

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