



termet®

INSTRUCTION MANUAL

INSTALLATION AND OPERATION

Gas-fired condensing central heating boilers

system boilers

ECOCONDENS NEX - 24

ECOCONDENS NEX - 28

ECOCONDENS NEX – 32

combi boilers

ECOCONDENS NEX - 24/30

ECOCONDENS NEX - 28/35

CE 1450



DEAR CUSTOMER

Congratulations on having chosen **termet** product.

We are glad that we can offer you modern, economical and environmentally friendly product, meeting particularly high requirements of European Standards.

Please read this instruction manual carefully as the knowledge of service rules and manufacturer's recommendations are the conditions of reliable, efficient and safe operation of the appliance.

Please keep this instruction manual for the whole operation life of the boiler.

We wish you satisfaction in using our product.

termet

IMPORTANT TIPS

- Read the instruction manual before you perform the installation and operation of the boiler.
- This instruction manual is an integral equipment of the boiler. It should be kept through the whole operation life of the boiler and carefully read. It contains all the information and warnings for safety during installation, use and maintenance to be followed.
- The boiler is complicated appliance as it contains numerous precise mechanisms.
- Reliable operation of the boiler depends mainly on appropriate performance of systems that boiler cooperates with such as:
 - gas system,
 - flue gas-air system,
 - central heating system,
 - domestic hot water system.
- The balanced flue system for type C boilers must meet the technical conditions specified in point 3.8 of this manual. Adapters connecting the boiler to the piping system must be provided with test connections.
- Flue gas - air system must be tight. Leaks on the connections of flue gas pipes can result in flooding of the boiler by condensate. Manufacturer is not liable for damage and malfunction of the boiler arising out from above mentioned reason.
- **Only qualified person ¹⁾may perform installation of the boiler. Make sure that the installer has confirmed in writing the tightness of the gas installation had been checked after connecting the boiler to the system.**
- Boiler may be installed and operated only in a room where all building works have been completed. It is not allowed to install and operate the boiler in a room where building works are still in progress.
- The cleanliness of air in a room where the boiler will be installed must meet the same requirements as for rooms designer for people.
- There should be installed appropriate filters on a central heating system and gas system. Filters are not included in a basic boiler equipment.
- An example of connecting a boiler to these systems is presented on fig. 3.5.1.
- All defects caused by lack of filters on central heating or gas supply will not be repaired under guarantee.
- Central heating system must be thoroughly cleaned and rinsed, the procedure is described on p.3.5.2.
- To avoid malicious calcification process of flue gas - water heat exchanger and also for reduce a risk of other items damage, there should be:
 - the proper water preparation in C.H. circuit according to p.3.5.2, Proper water parameters in C.H. system allows for long term operation maintaining its high efficiency, what leads to lower costs of gas consumption,
 - proper tightness of central heating system ensured by avoiding frequent refilling it with water,
- Complaints caused by gas-water heat exchanger calcification will not be repaired under guarantee.
- The initial start-up of the boiler as well as its repairs, adjustments and maintenance works must be performed only by AUTHORISED SERVICE.
- The boiler must be operated only by an adult.
- Do not do any repairs and modifications by yourself.
- Do not cover any ventilation grilles.
- Do not keep in the vicinity of the boiler any containers with flammable, aggressive and corrosive liquids and other similar substances.
- Any failures that are result of operation discordant to recommendations included in this instruction manual can not be subject to warranty claims.
- Manufacturer is not responsible for any failures being the result of faults during the process of installation and inobservance the regulations and instructions given by the manufacturer.
- Complying with recommendations given in this instruction manual ensures a long, reliable and safe operation of the boiler.

IT IS ADVISED TO BE ESPECIALLY CAREFUL WHEN USING DOMESTIC HOT WATER. IT MAY CAUSE BURNS!!!

Taking care of the health of the user, Termet's one function boilers have a factory-enabled feature, ANTILEGIONELLA, which periodically warms up the water in the tank up to 65°C thus killing all the developing bacteria. Effectively, the water after the heating cycle at the draw-off point may be higher than the set temperature. The water flowing at the draw-off point with a temperature higher than 50°C may cause burns, that is why it is recommended to install a thermostatic mixing valve in the hot water utility system.

NOTICE!

When you smell gas:

- do not use any electrical switches that could cause any spark,
- open the door and windows,
- shut down the main gas valve,
- immediately contact your gas supplier.

In case of any failure you should:

- disconnect the boiler from a power source,
- shut down the gas supply valve,
- cut off a water supply and drain a water from the boiler and also whole central heating system (when there is any risk of freezing of the system),
- drain the water from the system in any case of leakage that could cause a flood,
- contact the nearest **AUTHORIZED SERVICE** or the producer.

¹⁾ 'Qualified person'- person that has all required technical qualifications in an area of doing all the works necessary to connect appliances to the gas mains, central heating system and flue gas duct, accordingly to local regulations.

WARNING!

Operational instruction during the start-up of the condensing boilers
The instruction should be used after every draining water in the boiler
i.e. during the renovation of C.H. installation or repair of the boiler.

Read carefully the instruction manual before filling the boiler with water

1. Fill the heating circuit with water and vent the radiators before start.
2. Check the correctness of connection the electrical cords of boiler (network 230 V/50 Hz) to the network:
 L- brown; N – blue; PE – yellow-green. **Do not change the cords L and N!**
 In case of change the cords, the boiler will enter in failure state, on display will occur an error code E01.
 Mark the cords properly when connected directly to the electrical box, to eliminate the possibility of exchange.
3. **Close the gas cut-off valve!**
4. **Open valves which cut-off the boiler from C.H. circuit.**
5. Remove the front cover of the boiler by unscrewing the relevant fixing screws (fig. 1).
6. Remove the front cover of the combustion chamber (fig. 2).
7. Loosen the stopper on the automatic air-vent of the pump. In order to protect the pressure transducer from water, point the outlet of stopper to the right (fig. 3).
8. Turn on the device. Wait until the start procedure, testing the internal subassembly's and ventilating the combustion chamber will end (time about 10 – 30 sec.)
9. Fill the boiler with water by using the filling valve (in case of system boilers – the filling valve is mounted on C.H. installation, in case of combi boilers – the filling valve is on the boiler's equipment – see p.3.5). Open the filling valve slowly to protect the boiler's and the C.H. installation's components against the results of a hydraulic shock.
10. During filling the boiler with water control the pressure by using the analogue manometer mounted on the boiler's front cover or the electronic manometer by reading the pressure from display of the controller (depending on the boiler's type). Shut off the filling valve after reaching the pressure of 1,0 – 1,5 bar.
Note: in some models of boilers, after end of the start procedure, the "support the venting of boiler" function starts. This function is signalized on the controller display by "Po" and lasts 3 min. Start the "support the venting" function requires the water pressure above 0,5 bar, that's why during this procedure check and fill up the water pressure in the boiler, it is best to maintaining it the range of 1,0-1,5 bar.
11. Set the operating mode on WINTER according to the boiler instruction. If to the boiler controller has been connected the room thermostat than increase the desired temperature; the boiler should start operating in C.H. mode.
12. Because the gas valve outside the boiler is closed, the boiler will stop operate (E01 error code – a lack of gas). It allow for continuous pump operation and for removal of the air flowing in with water from the installation and for continuous water flow through the heat exchanger. Leave the boiler in this state for 2-3 min.
13. Delete E01 code by "reset" button and set the boiler controller on pressure reading mode (in version without an analogue manometer). During the first days of boiler operating it is recommended to set the water pressure in C.H. circuit on 1,8-2,0 bar. It will facilitate the work of the air-vent on the boiler pump and on the components of C.H. circuit. **
14. **Unscrew the gas valve** and delete E01 code again.
15. Set the desired operating parameters of the boiler according to the instruction manual. ***
16. Check the water pressure in C.H. circuit and if it's necessary fill the pressure up to the right level.

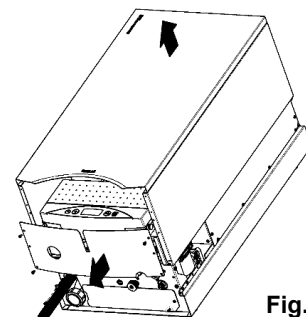


Fig. 1

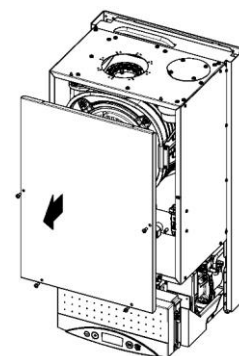


Fig. 2

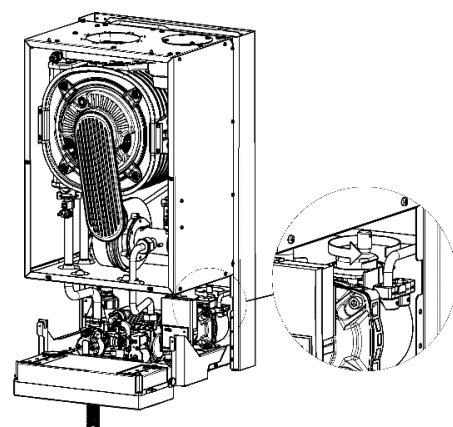


Fig. 3

* Depending on the size of C.H. circuit time of filling the boiler with water can be different. It is recommended to earlier fill the C.H. installation with water.

** In home C.H. circuits the nominal operating pressure should be set on 1,2-1,6 bar.

*** Note! The boiler is factory set on operating in the radiator heating. In case of the floor heating, the boiler control system shall be adapted to other operating parameters. This action is performed by Authorized Service Company.

1. INTRODUCTION	3
2. BOILER DESCRIPTION	3
2.1. TECHNICAL SPECIFICATION	3
2.1.1. <i>Technical features</i>	3
2.2. DESIGN AND TECHNICAL SPECIFICATIONS OF THE BOILER.....	3
2.2.1. <i>Main units of the boiler</i>	3
2.2.2. <i>Technical data</i>	5
2.3. PROTECTION EQUIPMENT.....	6
2.4. OPERATION DESCRIPTION.....	6
2.4.1. <i>Way of heating the water for central heating system</i>	6
2.4.2. <i>Temperature regulation dependent on external temperature</i>	6
2.4.3. <i>Method of D.H.W. heating in combi boilers</i>	7
2.4.4. <i>The way of heating the water in system boiler cooperating with domestic water tank.</i>	7
2.4.5. <i>Operation of the pump with adjustable speed.</i>	8
3. BOILER INSTALLATION	8
3.1. REQUIREMENTS OF BOILER INSTALLATION.....	8
3.1.1. <i>The regulations on the water installation, gas and the flue gas system</i>	8
3.1.2. <i>Regulations related to the room</i>	8
3.1.3. <i>Requirements for electrical installation</i>	9
3.2. PRELIMINARY CHECK ACTIVITIES	9
3.3. MOUNTING THE BOILER ON THE WALL.....	9
Fig. 3.3.1. <i>Installation dimensions of boiler</i>	9
3.4. CONNECTION TO THE GAS INSTALLATION	10
3.5. CONNECTION OF THE BOILER TO A WATER SYSTEM OF CENTRAL HEATING.....	10
Fig. 3.5.1. <i>Boilers installation requirements</i>	10
3.5.2. <i>System cleaning and water treatment for the C.H. filling</i>	10
3.6. CONNECTION OF THE BOILER TO A DOMESTIC HOT WATER SYSTEM	11
3.7. CONDENSATE OUTLET.....	11
3.8. FLUE GAS OUTLET.....	11
3.8.1 <i>Concentric balanced flue system (C13) with a horizontal outlet through an external wall or roof.</i>	12
3.8.2 <i>Concentric balanced flue system (C33) with a vertical outlet through flat and sloping roofs.</i>	12
3.8.3 <i>Balanced flue system (C53) with separate flue gas discharge ducts and air supply ducts</i>	12
3.8.5 <i>Concentric balanced flue system (C93) to be connected to a flue gas discharge duct laid in a shaft. Combustion air is supplied through a shaft.</i>	13
3.9. CONNECTION OF ADDITIONAL DEVICES.....	14
Fig.3.9.1a <i>Electrical terminals controller in combi boilers</i>	14
Fig.3.9.1b. <i>Electrical terminals controller in system boilers</i>	14
3.9.2. <i>Connection of a room temperature regulator</i>	14
3.10. CONNECTING THE OUTSIDE TEMPERATURE SENSOR	15
3.11. CONNECTING THE REGULATOR WITH 0-10V SIGNAL	15
4. BOILER ADJUSTMENT AND PRELIMINARY SETTING	15
4.1. INTRODUCTORY REMARKS	15
4.2. ADJUSTING THE BOILER TO COMBUST ANOTHER TYPE OF GAS	15
4.3. FAN CHARACTERISTICS.....	15
Fig. 4.3.1. <i>Characteristic of the fan- type PX118</i>	15
4.4. PUMP CHARACTERISTICS	15
Fig. 4.4.1. <i>Pump characteristic</i>	15
5. STARTUP AND OPERATION OF THE BOILER	16
5.1. INITIAL STARTUP OF THE BOILER	16
5.2. INCLUSION AND OPERATION.....	16
5.3. OPERATING MODES OF THE CONTROLLER	16
5.4. SIGNALIZATION OF OPERATION STATES AND DIAGNOSTICS	17
5.4.1. <i>Signalisation of the start of heating in CH or DHW system</i>	17
5.4.2. <i>Signalisation of anti-freezing function operation in STAND BY mode</i>	17
5.4.3. <i>Displaying the water pressure in CH installation</i>	17
5.4.4. <i>Displaying parameters</i>	17
5.4.5. <i>DHW heating blockade indicator for one-function boilers</i>	17
5.4.6. <i>Support the venting of heating system</i>	17
5.5. CHANGING THE CH OR DHW TEMPERATURE SETTINGS	18
5.5.1. <i>Temperature settings in CH circuit</i>	18
5.5.2. <i>Temperature settings in DHW circuit</i>	18
5.6. CONTROLLER CONFIGURATION – BOILER PARAMETERS SETTING	18
5.7. INTERRUPTION IN BOILER OPERATION	18
5.8. DIAGNOSTICS	18
5.8.1. <i>Signalisation of error codes during the emergency procedures implementation</i>	18
5.8.2. <i>Signalisation of error codes in emergency situations without locking</i>	18
5.8.3. <i>Signalisation of emergency switching off with locking</i>	18
5.8.4. <i>Error list</i>	19
6. MAINTENANCE, INSPECTIONS, CHECKING OF THE OPERATION	20
6.1. INSPECTION AND MAINTENANCE	20
6.2. THE MAINTENANCE OPERATIONS TO BE PERFORMED BY THE USER.....	20
6.3. RANGE OF TECHNICAL MAINTENANCE PERFORMED BY SERVICE COMPANY	20
7. BOILER EQUIPMENT	20
TABLE 7.1.	20

1. INTRODUCTION

Combi condensing boiler is designed for supplying central heating systems and for heating domestic water.

In this manual there are described below mentioned types of ECOCONDENS NEX - combi boilers designed for supplying a central heating systems and for heating domestic water in instantaneous water-water heat exchanger:

type ECOCONDENS NEX -24/30

type ECOCONDENS NEX -28/35

and system boilers designed for supplying a central heating system and heating domestic water in separately connected water tank:

type ECOCONDENS NEX -24

type ECOCONDENS NEX -28

type ECOCONDENS NEX -32

Adaptation of the following types of boilers to work with the tank needs to be made by AUTHORISED SERVICE.

ECOCONDENS NEX boilers take the air for combustion process from outside the room (in which combustion circuit is sealed) with respect to the residential area of the building in which it is installed - type of installation: C13, C33, C43, C53, C63, C83, C93 or take the air for combustion process from the room that meets appropriate conditions (required by law) - type of installation: B23.

Further information regarding the type – according section 3.8 and EN 15502-2-1:2022

2. BOILER DESCRIPTION

2.1. Technical specification

2.1.1. Technical features

- Electronic fluent flame modulation for central heating system and domestic hot water;
- Electronic ignition with ionization flame control;
- Adjustable boiler power;
- Regulation of heating water and domestic water temp.;
- Soft ignition function;
- Inlet gas pressure stabilisation;
- Adopted to cooperate with closed circuit in CH system

2.2. Design and technical specifications of the boiler

2.2.1. Main units of the boiler

Descriptions for fig. 2.2.1.1. ÷ 2.2.1.3.

- | | |
|--|--|
| 5. Fan, | 19. Heating water pressure transducer, |
| 7. Pump, | 20. Air -vent; |
| 8. Gas unit, | 21. Plate water-water heat exchanger, |
| 10. Flame control/ Ignition electrode, | 22. Filling valve of installation, |
| 11. Burner, | 25. Safety valve - 3 bar, |
| 12. 3-way valve, | 26. Domestic water flow sensor, |
| 13. Flue gas-water heat exchanger, | 27. NTC sensor of domestic water temperature, |
| 15. Temperature limiter as a protection against exceeding the upper limit water temperature, | 28. NTC temperature sensor of heating water - return (only in boilers with PWM pumps), |
| 16. Thermal fuse of flue gas, | 29. Siphon |
| 17. Expansion vessel, | 30. Mixing unit |
| 18. NTC sensor of heating water -supply, | 33. Air inlet pipe |

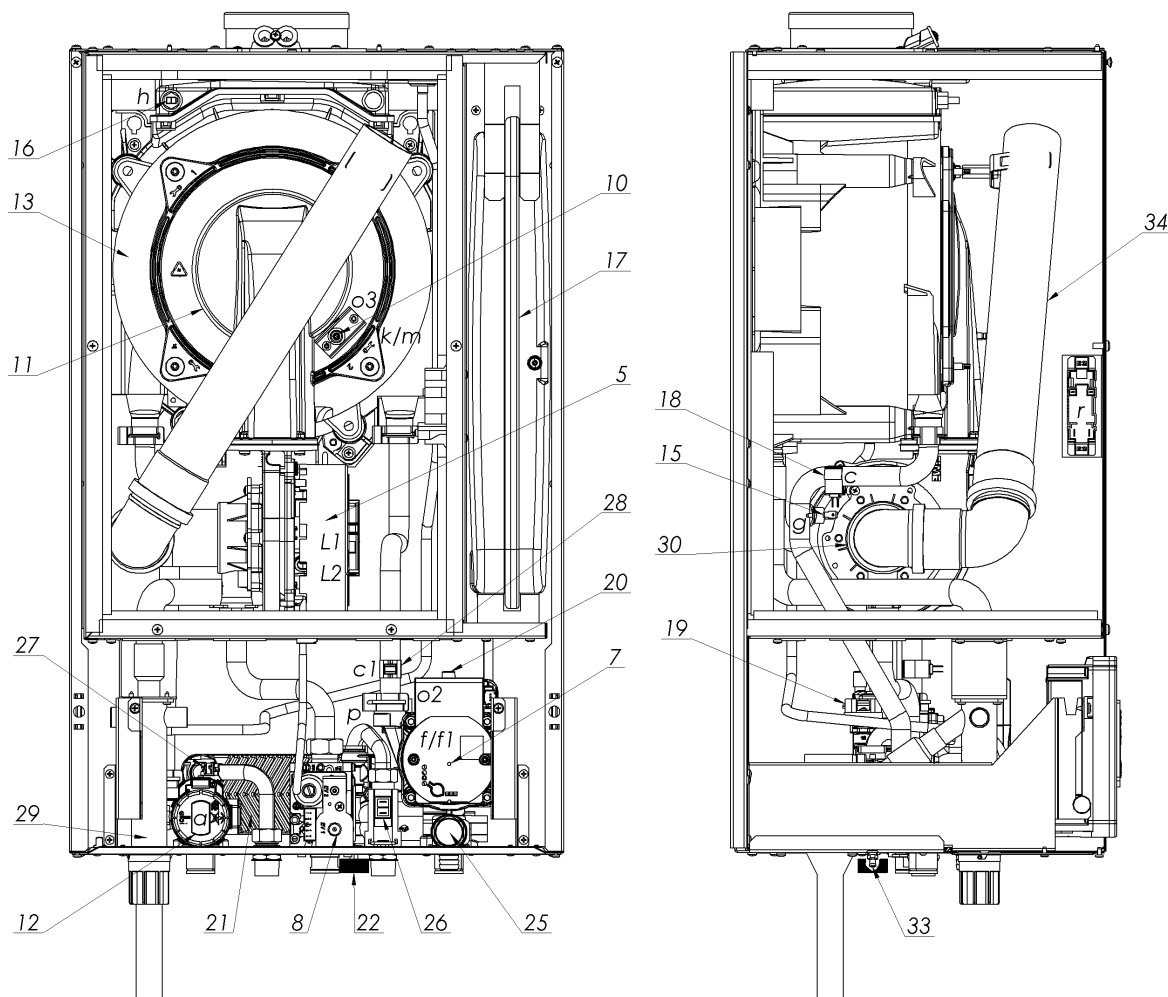


Fig.2.2.1.1. Location of elements in combi boiler

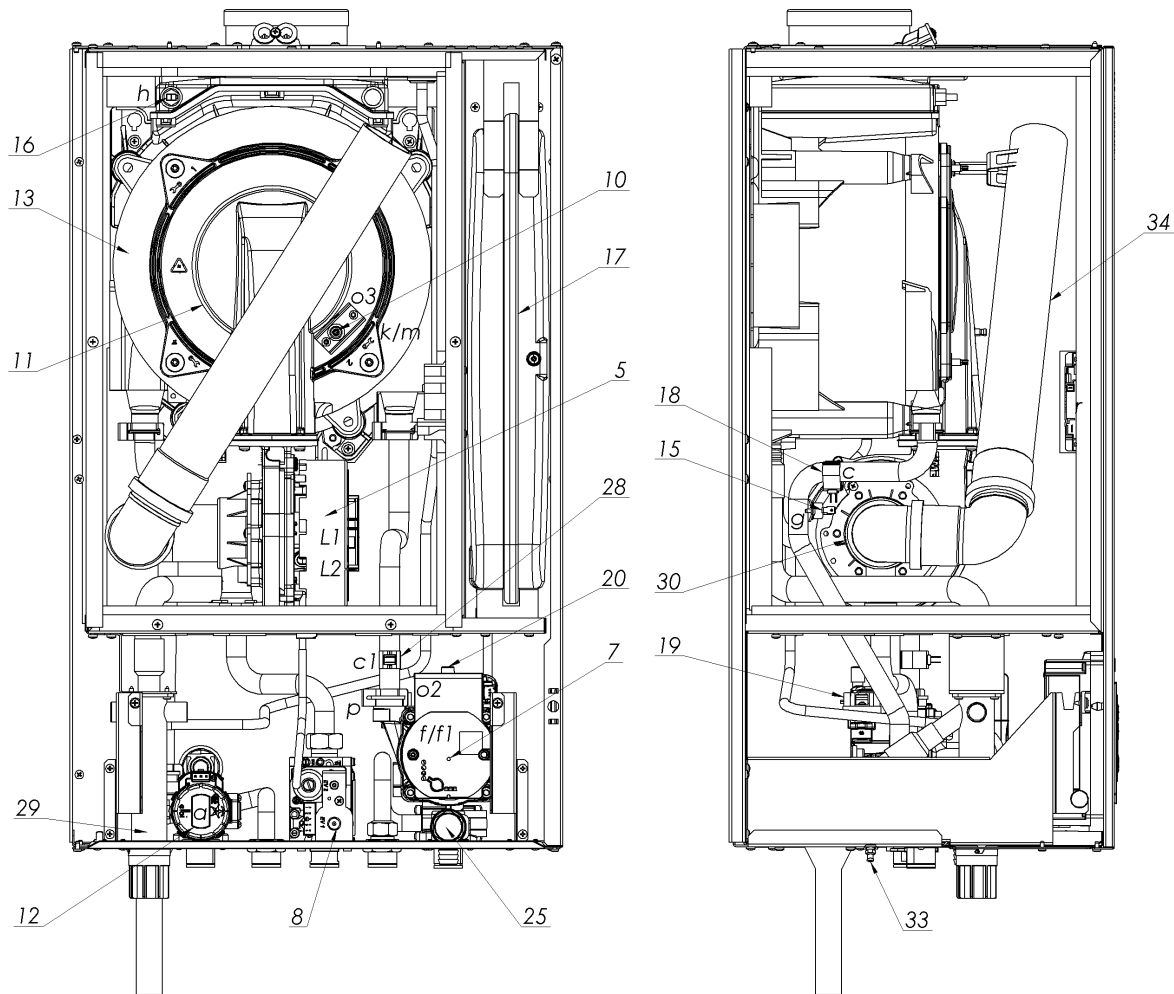


Fig.2.2.1.2. Location of elements in system boiler

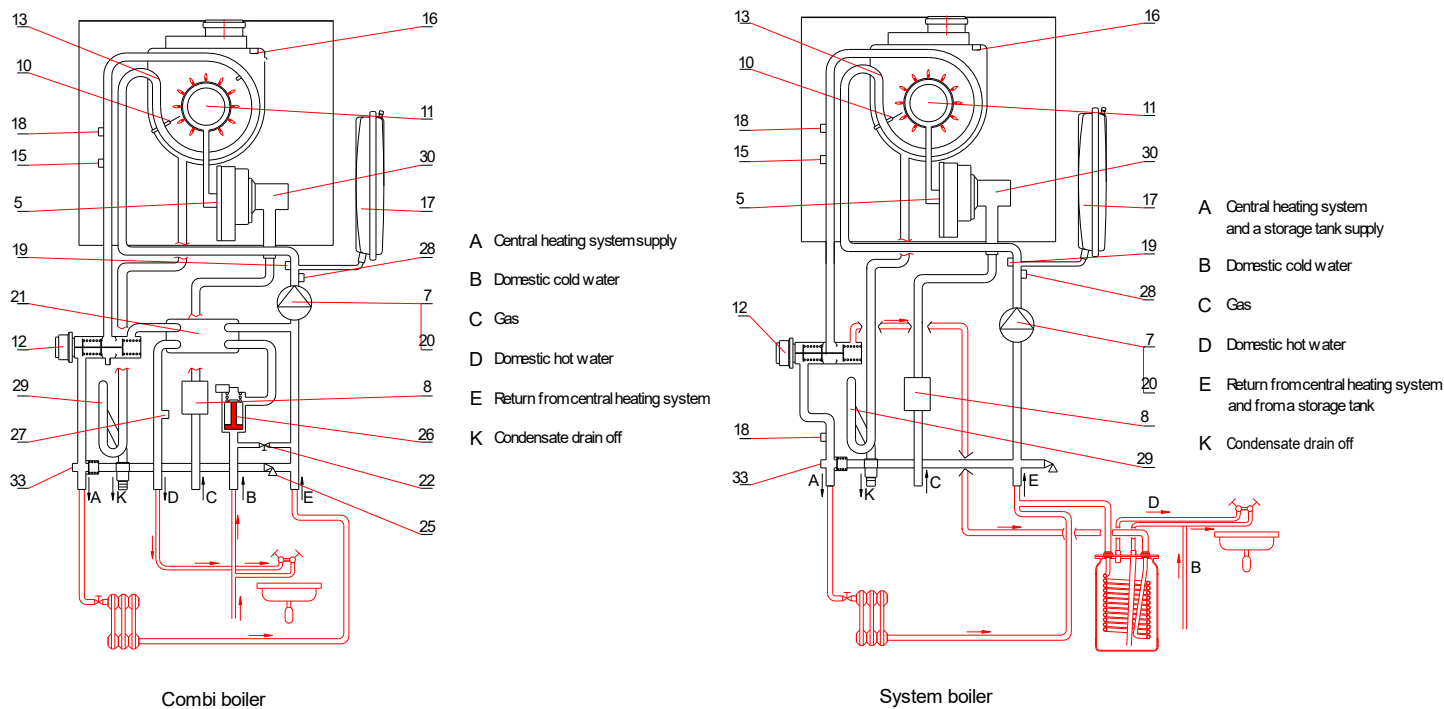


Fig.2.2.1.3. Scheme of boiler operation

2.2.2. Technical data

Parameter	Unit	SYSTEM BOILER ECOCONDENS NEX			COMBI BOILER ECOCONDENS NEX	
		-24	-28	-32	-24/30	-28/35
		Size				
Energetic parameters						
Central heating circuit						
Power range for P04=10÷12 (Min. fan speed at 1000÷1200 RPM)						
Boiler thermal power at 80/60°C (modulated)	kW	3.1 ÷ 24.0	3.5 ÷ 28.2	3.5 ÷ 32.0	3.1 ÷ 24.0	3.5 ÷ 28.2
Boiler thermal power at 50/30°C (modulated)	kW	3.5 ÷ 26.5	3.9 ÷ 31.1	3.9 ÷ 35.3	3.5 ÷ 26.5	3.9 ÷ 31.1
Heat load	kW	3.2 ÷ 24.5	3.6 ÷ 28.8	3.6 ÷ 32.7	3.2 ÷ 24.5	3.6 ÷ 28.8
Modulation range	%	13÷100	12÷100	13÷100	13÷100	12÷100
The efficiency of the boiler at nominal load and average boiler water temp. 70°C	%	98				
The efficiency of the boiler at partial load and return water temperature 30°C	%	108				
Seasonal space heating energy efficiency η_s	%	95,5	94,2	94,7	95,5	94,2
Seasonal space heating energy efficiency class		A				
Wytworzone ciepło użytkowe: - przy znamionowej mocy cieplnej P ₄ - przy 30% mocy znamionowej P ₁	kW kW	24.0 7.2	28.0 8.4	32.0 9.6	24.0 7.2	28.0 8.4
Useful efficiency: - η_4 - η_1	%	88.5 97.5	88.3 97.4	88.3 97.4	88.5 97.5	88.3 97.4
Gas consumption ⁽¹⁾ : natural: 2H-G20 – 20mbar liquid: 3P-G31 – 30mbar	m³/h kg/h	0,31 ÷ 2,59 0,11 ÷ 0,97	0,36 ÷ 3,04 0,13 ÷ 1,14	0,36 ÷ 3,46 0,13 ÷ 1,29	0,31 ÷ 2,59 0,11 ÷ 0,97	0,36 ÷ 3,04 0,13 ÷ 1,14
Nominal kinetic pressure in front of the boiler for gas: natural 2H-G20; liquid 3P-G31	Pa (mbar)	2000 (20); 3000 (30)				
Maximum water pressure	MPa (bar)	0,3 (3)				
Max temperature (central heating)	°C	95				
Standard adjustable temperature	°C	40 ÷ 80				
Reduced adjustable temperature	°C	25 ÷ 55				
Lift of the pump at flow 0	kPa (bar)	60 (0,6)		70 (0,7)	60 (0,6)	70 (0,7)
Domestic hot water circuit.						
Nominal heat output of the boiler at temp. 80/60oC	kW	-----			3.1 ÷ 29.9	3.5 ÷ 35.2
Nominal heat load	kW	-----			3.2 ÷ 30.5	3.6 ÷ 35.5
The efficiency of the boiler at nominal load and average boiler water temperature of 70°C	%	-----			98	
Gas consumption (1): natural: 2H-G20 – 20mbar liquid: 3P-G31 – 30mbar	m³/h kg/h	-----			0,31 ÷ 3,22 0,11 ÷ 1,21	0,36 ÷ 3,75 0,13 ÷ 1,37
Water heating energy efficiency class		-----			A	A
Load profile					L	XL
Water pressure	MPa (bar)	-----			0,01 (0.1) ÷ 0.6(6)	
Min water flow	l/min	-----			2,0	
Max water flow (flow limiter))	dm³/min	-----			-----	-----
Range of water temperature regulation	°C	30 - 60				
Flow of domestic water for $\Delta t=30K$	dm³/min	-----			14	17
Environmental protection						
Emissions of nitrogen oxides	mg/kWh	46,9	39,6	44,0	46,9	39,6
Emission of NO _x (natural gas)	Klasa	6				
The pH of the condensate		Natural gas:- 5				
Sound power level L _{WA}	dB	37,4	37,4	46,2	37,4	47,8
Maximum CO level indicating that immediate maintenance, servicing and/or repair is required.		0,10%				
If this issue cannot be resolved immediately, the appliance must be taken out of service. The concentration of CO in the flue gas must always comply with local regulations of the country where boiler is installed.						
Hydraulic parameters						
Expansion vessel capacity	dm³	8				
Water pressure in expansion vessel	MPa (bar)	0.08±0.02 (0.8±0.2)				
Hydraulic resistance (at nominal power input and temp. 80/ 60 °C)	mbar	220-240	230-250	240-250	220-240	230-250
Electric parameters						
Type and supply voltage	V	~ 230 ±10%/ 50Hz				
Degree of protection		IPX4D				
Power consumption	W	110				
Standby mode power consumption P _{SB}	kW	0.0021				
Electricity consumption : - at full load e _{lmax} - at part load e _{lmin}	kW kW	0.0934 0.0674	0.0972 0.0676	0.0972 0.0676	0.0934 0.0674	0.0972 0.0676
Maximum nominal current value of output terminals	A	2				
Controller classification according to PN EN 298		F-M-C-L-X-K				
Type of flame sensor		ionization				
The parameters of flue gas						
Fan characteristics		section p. 4.3				
Flue gas mass flow at full load	kg/h	33,2	41,7	58,1	33,2	41,7
Flue gas mass flow at partial load	kg/h	5,7	6,3	8,6	5,7	6,3
The minimum flue gas temperature at minimum thermal power	°C	34	34	34	34	34

The maximum flue gas temperature at maximum thermal power	°C	61	66	66	61	66
Time parameters						
Time of central heating pump rundown	s	180				
Time preventing the anti-cyclical startup of the boiler (Anti-cycling time)	minutes	1+60				
Time of domestic hot water pump rundown	s	20-180				
Protection against pump and valve blocking	h / s	every 23 h water pump turns on for 15 s every 23 h + 1 min three way valve turn on for 15 s				
Assembly dimensions						
Connection to the chimney duct (→ section 3.8. and table 7.1.)	mm	Coaxial Ø80/Ø125, Coaxial Ø60/Ø100 or 2 separate Ø80 x Ø80				
Connection of heating water (CH) and gas	inch	G3/4				
Connection of DHW	inch	G3/4			G1/2	
Dimensions	mm	767x450x350				
Boiler weight	kg		50,5		52,5	55

⁽¹⁾ Individual gas consumption was given for reference gases in normal conditions (15°C, pressure 1013 mbar) considering useful efficiency of the boiler with 30°C of return water temperature. The values are indicative. The manufacturer reserves the right to make changes in the construction of the boiler, which are not mentioned herein and have no influence on the technical and functional characteristics of the product.

2.3. Protection equipment

- Protection against gas outflow
- Protection against explosive gas switching on
- Protection against exceeding the max temperature in the heating water system
- Protection against exceeding the upper limit of heating water temperature
- Protection against water pressure increase (1-st degree)- electronic
- Protection against water pressure increase (2-nd degree)- mechanical
- Protection against drop of water pressure
- Protection against water overheating
- Anti-freezing protection of the boiler
- Protection against the pump blockade
- Monitoring of the correct operation of the fan. Fan failure is detected if the current fan speed is different from that expected by the driver of the boiler.
- Protection against exceeding the upper limit temperature of flue gas (115°C).
- Protection against burner operation without water flow (only in boilers with PWM pumps)

Errors which do not require manual reset will cause return of the boiler to the normal operation after automatic disappearance of failure → section 5.8 - boiler diagnostics.

NOTICE!

In case of noticing repeated emergency boiler shut-down by any of the protection it is necessary to contact an Authorized Service Company in order to check the reason of boiler switching off and to repair it.

It is forbidden to make any unauthorized modifications in the protection system.

2.4. Operation description

2.4.1. Way of heating the water for central heating system

The boiler switches on if the heating water temperature drops about 5 degrees below the set temperature - as described in section 5.5.1 and the room thermostat gives the signal to heat. Then the following conditions occur simultaneously:

- power supply of the three-way valve (item 12 towards the central heating installation),
- pump supply (→ item 7),
- fan supply (→ item 5),
- the sequence of ignition,
- then the driver starts the fan speed regulation so as to obtain the desired temperature of heating water

The boiler switches off when the room temperature control unit is signaling reaching the desired temperature in the room or when heating water temperature exceeds the set temperature by the value of hysteresis (parameter P20, default 5°C) in this case flashing symbol  is displayed on the right-hand side of the display.

After switching off the burner, pump runs for about 180 s, and fan for 15 s.

Restart of the boiler will be done automatically under the following conditions simultaneously:

- heating water temperature is lower by 5°C than the set temperature,
- room temperature control unit provides the signal "HEAT",
- waiting time determined by parameter P25 have passed (default 3 minutes) if flashing symbol  was displayed.

The list of driver parameters according to Table 5.6.

Notice:

Signal occurs, if: RT regulator contacts are closed or OpenTherm regulator provides the signal "HEAT" or occurs necessity from the weather function in operating mode without room thermostat (P26=2).

2.4.2. Temperature regulation dependent on external temperature

If an external temperature sensor has been connected the controller detects it automatically and goes to the weather function mode. Controller adjusts the heating water temperature making it dependent on outside temperature and coefficient of the slope of the heating curve Kt" and parameter P22 → diagram shown on the Fig. 2.4.2.1 and 2.4.2.2

Changing the value of the coefficient Kt is described in Section 5.5.1.1.

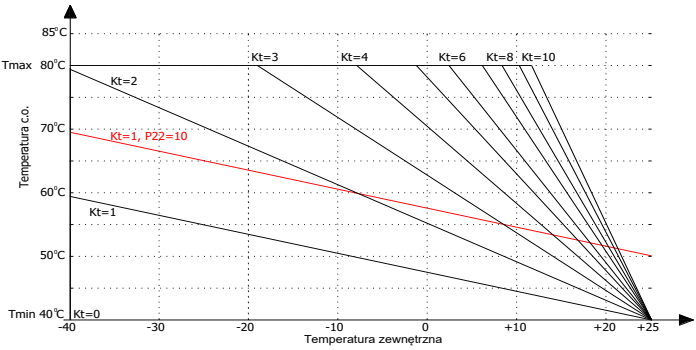


Fig.2.4.2.1. Diagram of the heating curve (standard heating)

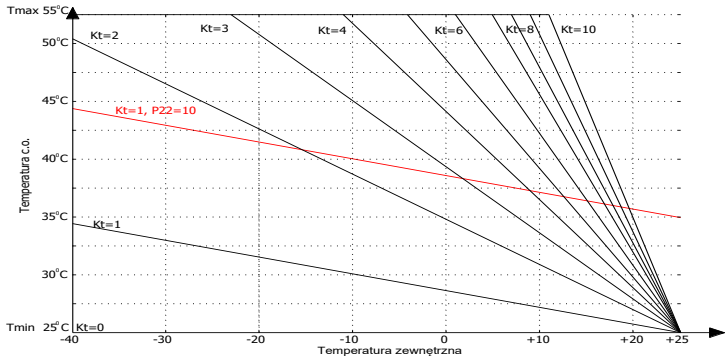


Fig.2.4.2.2. Diagram of the heating curve (floor heating)

Notice:

- 1) for value $T_{out} \geq 25^{\circ}\text{C}$ and $P22=0$ designed temp. $T_{c.h.}$ is always equal to T_{min} .
- 2) at max. coefficient K_t and $P22=0$, T_{max} is reached when $T_{out} \leq 10^{\circ}\text{C}$.
- 3) T_{max} will not exceed 80°C for standard heating and 55°C for floor heating regardless of the value $P22$
- 4) In case, when weather function operates without room thermostat (parameter $P26=2$), RT input is treated as an input for choice of time of day: DAY (contact open) NIGHT (contact closed). During NIGHT time, calculated temp. T_{CH} is reduced by the $P28$ parameter value. Boiler starts heating CH water if the outdoor temperature is lower than $P27$ parameter value. Boiler stops heating CH water if the outdoor temperature is higher than $P27$ parameter value at least 3 hours.
- 5) If $P26=0$, then weather function doesn't work, it is only outdoor temperature measurement.
- 6) In case of connecting OpenTherm regulator, the weather function is performed through the connected OpenTherm regulator if parameter $P26=1$
- 7) Parameter $P29$ controls maximum C.H. water temperature.

2.4.3. Method of D.H.W. heating in combi boilers

Combi boiler heats the water in a instantaneous way. Water temperature is set using the buttons +/- ($\rightarrow$ p.5.5.2) in the range 30°C to 60°C . The water temperature at the outlet depends on water temperature at the inlet.

Water flow shall be determined by draw-off valve in the outlet.

In this mode the water heating demand occurs when the flow sensor turns on at the value above 2.0 l/min (ends at a flow $< 1.5 \text{ l/min}$.)

Then follows the sequence:

- switching the power of the 3-way valve ($\rightarrow$ item 12) in direction of the water-water heat exchanger supply for the pump ($\rightarrow$ item 7),
- after flame detection and the end of startup sequence, signal from the NTC sensor (DHW) adjusts the fan speed to reach the desired temperature of domestic hot water $\rightarrow$ item 27

Central heating hot water flows through the water-water heat exchanger segments and heats the water. The heated water is directed to the point of its collection.

NOTICE: In the case of a lower fan rotation range caused by low water consumption, there is a water temperature increase. Turning off the gas flow to the main burner will come when:

- DHW temperature exceeds 65°C (for parameter $P30=0$)
- DHW temperature exceeds the set point value for 5°C (for parameter $P30=1$)

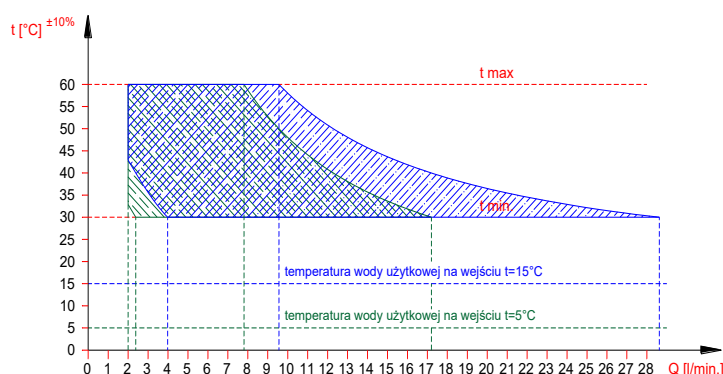


Fig. 2.4.3.1. Diagram of domestic water temperature at the boiler outlet at thermal power of 30kW depending on the water flow rate.

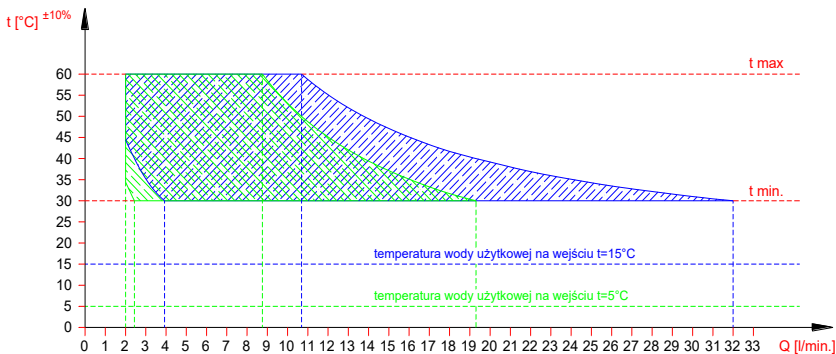


Fig. 2.4.3.2. Diagram of domestic water temperature at the boiler outlet at thermal power of 35kW depending on the water flow rate.

2.4.4. The way of heating the water in system boiler cooperating with domestic water tank.

The boilers are factory designed for cooperation with domestic hot water tanks. The boiler may cooperate with all domestic water tanks available in Termet's offer. Adjustment and display of domestic water temperature are done by the control panel of the boiler.

The process of heating the domestic water:

When the water temperature sensor detects the temperature lower by 5°C of the set value (look p.5.5.2) then the process of pumping the water to the central heating system will be stopped. Heating the domestic water with the boiler cooperation with the tank of domestic hot water is as follows:

- water temperature sensor detects the temperature lower by 5°C of the set value (for example as a result of unscrewing the tap);
- boiler controller switches the three-way valve to pump water to a short circuit, while giving a signal to the spark generator and gas valve $\rightarrow$ item 8;
- heating water with temperature described by parameter $P21$ (default 75°C) flows through the coil of tank (short circuit);
- after exceeding by 1°C set water temperature in the tank the boiler controller switches the 3-way valve for long circuit and after meeting below mentioned conditions the heating water is pumped into the central heating system:
 - heating water temperature is lower by 5°C of the set temperature
 - room temperature regulator gives a signal "HEAT".

The temperature of hot water at the point of consumption may be different from the set value, and therefore it is advisable to install a mixing valve for domestic hot water systems.

Water heating in the storage tank is active when the jumper is mounted on the TANK-TIMER connector (Fig.3.9.1.1) or the OpenTherm regulator is connected to the OT connector. OpenTherm regulator allows for programming the water heating time in the storage tank. The set water temperature value must be higher or equal to the minimum value. After setting the value lower than the minimum (30°C), the storage tank is switched off. This does not apply for frost protection function.

Note: To eradicate legionella bacteria in the storage tank, TERMET boilers have a factory-enabled automatic mode of the ANTI-LEGIONELLA function. In this case, the boiler switches on every 168h to work with the storage tank and heats water to 65°C . The automatic mode can be changed to manual mode by an authorized service technician. In manual mode, the user at any time can manually initiate a single cycle of tank heating to 65°C .

2.4.4.1. Manual initiation of disposable tank overheating - Anti-legionella function in manual mode * (applies to the boilers with tanks):

When boiler is operating in SUMMER mode:

Hold the [5] button for approx. 1 second and the symbols characteristic for the antilegionella function will be displayed, i.e.: flashing key symbol, right field off, CW temperature on the left field and max symbol placed above it.

When boiler is operating in WINTER mode:

Hold the [5] button for approx. 1 second and the symbols characteristic for the service function will be displayed, and then after the next press the symbols characteristic for the antilegionella function will be displayed, i.e.: flashing key symbol, right field off, CW temperature on the left field and max symbol placed above it.

In both modes of operation:

To activate the Anti-legionella Function hold the button "+"[1] for 2 seconds. After activation symbol "key" will show up on the display. To activate the Anti-legionella mode you have about 3 seconds. After that time(or if you press the reset[4] button) boiler goes to the normal operating mode.

During operation of Anti-legionella Function, the temperature field is dimmed.

Completion of Anti-legionella Function is performed automatically or by pressing the reset[4] button or by change of operating mode.

2.4.5. Operation of the pump with adjustable speed.

In the boilers equipped with a pump with variable speed (PWM) during the work in DHW mode

- in two-function boilers the pump has maximum speed

- in one-function boilers the speed of the pump is determined by parameter P19

While heating water in C.H. system the controller regulates the pump according to:

For conventional PWM pump operation (parameter P15 = 0):

PWM Pump (activation by parameter P12) works with a modulated speed in C.H. system activating by signal from RT (room temperature regulator). The rotational speed is adjusted in such a way that in cooperation with the modulator to achieve the value

of ΔT (defined by parameter P13) between outgoing and return temperature of central heating system. There is maintained a priority to achieve and hold the set of temperature in central heating system. Minimum allowable rotation speed of the pump is determined by parameter P14. The maximum allowable rotation speed of the pump is determined by parameter P18

ECO mode (parameter P15 = 1):

PWM Pump (activation by parameter P12) works with a modulated speed in C.H. system activating by signal from RT (room temperature regulator). The rotational speed is adjusted in such a way that in cooperation with a modulator achieved value ΔT between outgoing and return temperatures of central heating system calculated on the basis of a preset ratio ECO (p.2.4.5.1). ECO factor is adjusted on the user interface in the range of 0.1 to 0.9. The default (optimal in most cases) value is 0.5. Selection of lower value results in lower gas consumption with less heat energy being placed into the room (simplified we decide what part of the radiator has to be warmed up). The user obtains the possibility of such a regulation of device to get the thermal comfort at minimum cost (less gas consumption, lower power consumption). The value 0,5 of the coefficient of ECO is the maximum value at which the control regardless of the temperature setting C.H. water seeks to meet the conditions of condensation (C.H. return temperature $\leq 55^\circ\text{C}$). It is recommended to work the system at the ECO ratio in the range of 0.1 to 0.5. If increasing the C.H. setting cannot obtain adequate thermal comfort should gradually increase the value of the ECO. ECO factor equal to 0.9 practically corresponds to the traditional work of the pump without speed control.

Irrespective of the mode of operation:

Preserved is a priority to achieve and maintain the set temperature C.H. water. Minimum allowable rotation speed of the pump is determined by parameter P14. The maximum allowable rotation speed of the pump is determined by parameter P18

NOTE:

If the temperature sensor of return central heating water is damaged or is not connected, the pump works with a constant speed.

2.4.5.1. The expected value of T depending on the setting C.H. water and the coefficient of ECO.

The expected value of T depending on the setting C.H. water and the coefficient of ECO.

Standard heating (P8 = 0): Setting WG									
Eco	40°C	45°C	50°C	55°C	60°C	65°C	70°C	75°C	80°C
0,1	24	30	35	35	35	35	35	38	42
0,2	21	26	30	30	30	30	30	33	37
0,3	18	22	26	26	26	26	26	28	31
0,4	15	19	22	22	22	22	22	24	26
0,5	12	15	17	17	17	17	17	19	21
0,6	9	11	13	13	13	13	13	14	15
0,7	6	7	8	8	8	8	8	9	10
0,8	3	3	4	4	4	4	4	4	5
0,9	0	0	0	0	0	0	0	0	0

Floor heating (P8 = 1): Setting WG					
Eco	35°C	40°C	45°C	50°C	55°C
0,1	16	24	30	35	35
0,2	14	21	26	30	30
0,3	12	18	22	26	26
0,4	10	15	19	22	22
0,5	8	12	15	17	17
0,6	6	9	11	13	13
0,7	4	6	7	8	8
0,8	2	3	3	4	4
0,9	0	0	0	0	0

3. BOILER INSTALLATION

The boiler must be installed by an authorized service company accordingly with local regulations. After the boiler installation check the tightness of all connections of gas, water and flue gas system. Service company is responsible for the proper installation of the boiler.

Installation of the boiler must be made so as not to cause any tension of the installation that may cause increased volume of work.

After exploitation of the boiler, disassembled product transfer to a specialized unit for utilization.

3.1. Requirements of boiler installation

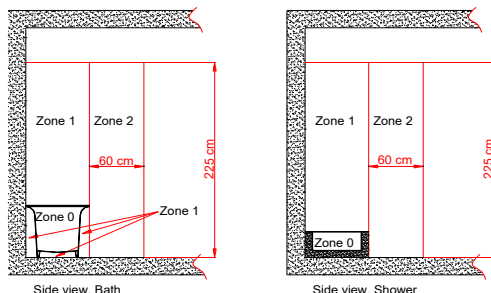
3.1.1. The regulations on the water installation, gas and the flue gas system

Water, gas and flue gas systems must meet local regulations as well as use of the gas, ventilation and flue gas installation.

Using of gas appliances, flues and ventilation by the user should be consistent with local requirements relating to the technical conditions of use the residential buildings.

Before installing the boiler the consent from the District Department of Gas, Chimney Sweep Company and Building Administration must be obtained.

3.1.2. Regulations related to the room



Requirements for premises where gas appliances are installed shall be in accordance with local regulations. The room where the boiler is to be installed should ensure the air supply and venting system necessary for gas combustion in accordance with local regulations. The location of ventilation should not cause the water freezing. The temperature in the room where the boiler is installed should be higher than 6°C .

The room should be protected against freezing, free from dust and aggressive gases.

It is forbidden to install the device in a laundry rooms, drying rooms and in varnish, cleaners, solvents and sprays storages.

Boiler with a thermal capacity above 30 kW should be installed in a technical room.

Place of installing a boiler in a room equipped with bath or shower with a pool and the way of connecting it to the electrical system- in accordance with the requirements of HD 60364-7-701:2007. The device covered by this instruction has a degree of electrical protection provided by the housing IPX4D. Boiler equipped with power cord with a plug can be installed in zone 2 or further - must not be installed in zone 1.

In zone 1 can be installed only if it is permanently connected to a power source in accordance with HD 60364-7-701:2007.

Fig. 3.1.2.1. The zones dimensions in areas containing a bath or shower with a pool

3.1.3. Requirements for electrical installation

The boiler has been designed for operation with single-phase alternating current with rated voltage of 230 V/50 Hz.

The boiler has been designed as a "class I" device and must be connected to an electrical outlet with ground terminal in accordance with HD 60364-4-41:2007.

The main socket from which boiler is powered must comply with HD 60364-6-61:2016

Pay attention on correctly connecting the power cord. If power cord is connected incorrectly:

- the boiler enters in failure state
- on display occurs E01 (→section 5.8.4)

In this case change cords "L" and "N" in the socket.

When the correct connection is detected, the boiler unlocks automatically.

The boiler has a degree of electrical protection provided by the housing - IPX4D.

In case the boiler is permanently connected to the power supply the electrical installation should be equipped with means of disconnecting the boiler from the power source, it should be executed by junction box. The junction box must be equipped with protection degree appropriate for the defined assembly zone.

In order to connect the boiler to the junction box, it is recommended to:

- cut the power cord to a suitable length for connection to the box
- pull off cable insulation
- put the cable-end sleeve with the appropriate diameter

This prepared cables connect according to the following diagram

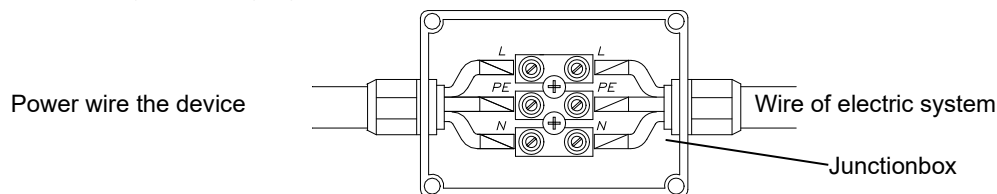


Fig 3.1.3.1 Wire colors: L – brown; N – blue; PE – yellow-green

3.2. Preliminary check activities

Before starting the installation work, check:

- whether the boiler is factory designed for the type of gas supplied from the gas system. The type of gas which the boiler is adjusted to is specified on the rating plate on the cover of the boiler;
- whether the water system and radiators have been properly rinsed with water in order to remove rust, fillings scale, sand and other dusts that could disturb the proper operation of the boiler (for example increase the water flow resistance in central heating system) or to pollute the heat exchanger,
- whether the mains voltage has a value of 230V and that the socket has an efficient safety contact (complies with HD 60364-6-61:2016).

3.3. Mounting the boiler on the wall

Hang the boiler on hooks fastened durably in the wall using a beam placed in upper part of the boiler. The boiler shall be so located as to permit the eventual repair without any need to dismantling from the installation.

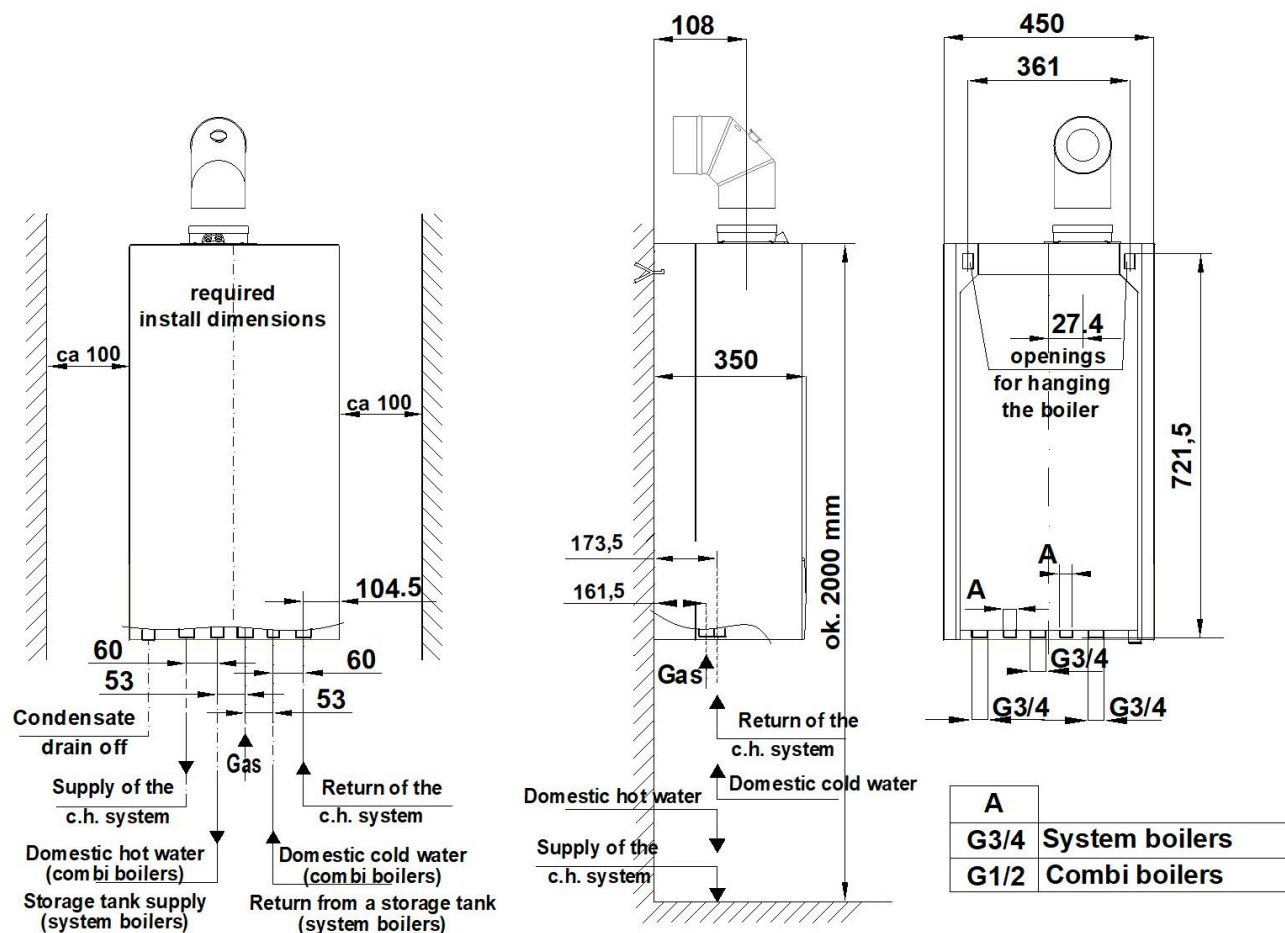


Fig. 3.3.1. Installation dimensions of boiler

3.4. Connection to the gas installation

Connect a gas supply pipe directly to the connector of the boiler gas unit using of connector subassembly no 0696.00.00.00 (in boiler equipment).

It is necessary to install a gas filter on the gas supply pipe. This filter is not included in the standard boiler equipment. The gas filter is necessary for a proper operation of a gas unit and a burner.

Install a cut-off valve on the gas pipe in an accessible place.

3.5. Connection of the boiler to a water system of central heating

- Power supply and return connectors of the central heating boiler should be screwed to the installation. Location of the connectors → Figure 3.3.1.
- **Install a water filter on a water return from central heating system (in front of the connection with the pump). The filter is not included in standard boiler equipment.**
- The central heating system should be thoroughly rinsed out before the boiler is connected.
- In the central heating system it is permitted to use as a heat carrier any antifreeze fluids which can be used in central heating systems.
- The cut-off valves needs to be installed between the boiler and central heating system so that the boiler could be dismantled without draining the system.
- Do not install any thermostatic valves on radiators in the room where the thermostat is installed. The temperature controller takes the control over the function of temperature and it cooperates with the boiler.
- On at least one of radiators of the central heating system there shouldn't be installed a thermostatic valve.
- It is recommended to lead out a water from a safety valve 0,3 MPa (3 bar) (item 25) to a floor drain by a tube or hose otherwise during the safety valve activation there is a risk of flooding a room what is excluded of producer's liability.

Selection of expansion vessel

Boilers are adjusted to be connected to a central heating system with the maximum capacity of 140 liters. The assembly to installation with larger capacity is acceptable only after applying an additional expansion vessel. A proper expansion vessel should be selected by the designer of central heating system. Installation of expansion vessel should be made by an installation contractor in accordance with applicable regulations.

NOTICE! Before installing the boiler thoroughly flush the central heating system to free it from any solid impurities.

It is recommended that after first start up of the boiler and heating up of the installation drain the water from the system to remove residues of pastes metallurgical and precautionary measures of heaters. These activities would benefit for the operation of the device, its parameters and components life.

After boiler installation:

- Fill the heating system with water by filling valve → item 22 Fig 2.2.1.1. for combi boiler. For system boiler install filling valve from the installation. Pressure in cold installation should amount 1,0 to 1,5 bar (indicated by manometer).
- Vent the installation of central heating and boiler;
- Check the tightness of boiler connections in central heating system.

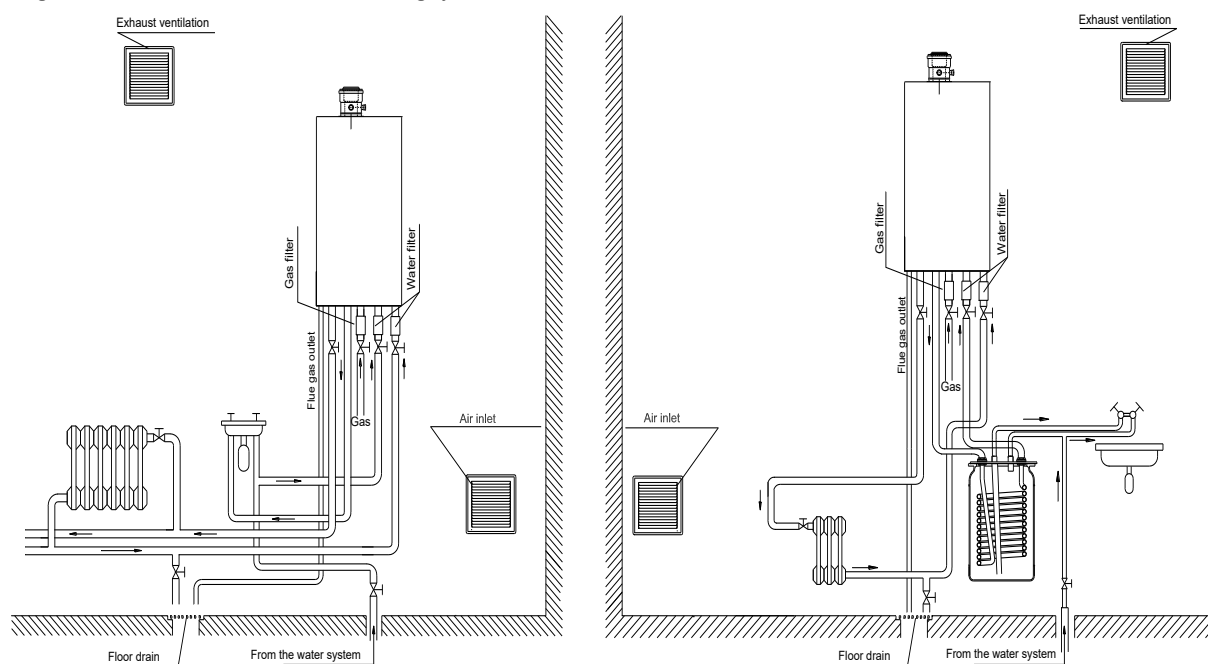


Fig. 3.5.1. Boilers installation requirements

3.5.2. System cleaning and water treatment for the C.H. filling

Every component of C.H. system is threatened by limestone deposits, corrosion and other dangerous processes. Boiler is the most expensive part of C.H. system and it is necessary to protect its components like heat exchanger and other parts against harmful processes. Correct C.H. circuit preparation for using relies on making two operations: cleaning the CH system and treating the water that fills the system.

System cleaning

In new installation it is possible to find some remains of industrial process soldering and welding remains, flux, oil and grease residue among others. Older installations usually have products of corrosion in them. It necessary to clean up the systems with a water to remove the remains before boiler is mounted. Afterwards, system should be cleaned with appropriate chemicals. After that it is necessary to rinse the installation with water.

Water treatment to fill the system

For filling the system, it is recommended to use water with parameters: pH 6,5- 8,5, hardness < 10 °n (~ 18°F). Do not use demineralised or distilled water. To ensure protection against rocks despositing, corrosion, it is recommended to use a special inhibitor. Antifreeze liquid can also be used.

Low-temperature circuits

In the low-temperature area, it is recommended to treat the water.

Filtration technique

Additionally, in order to ensure the quality of operation heating system, it is recommended to mount a modern filters, which works on the principle of the magnetic and cyclone effect.

Notice:

- method and amount of use specific products for system cleaning and water treatment should be in accordance to the product manufacturer's instruction.
- above steps should be made by the authorized installer or service technician.

3.6. Connection of the boiler to a domestic hot water system

It is recommended to install cut-off valves on a domestic hot water system what will enable easier maintenance and service

It is recommended to install a water filter on the connection with the domestic water supply. This filter is not included in the standard boiler equipment.

3.7. Condensate outlet

Condensate formed during the combustion process must be drained according the following conditions:

- Installation of condensate drain must be made of corrosion-resistant material.
- Connection of draining the condensate cannot be blocked.
- To facilitate to drain the condensate through the flue gas all horizontal flue pipes must be installed with a fall of 3° (52mm / m).

3.8. Flue gas outlet

The flue gas from the boiler should be discharged in accordance with the applicable regulations and this manual. This operation should also be agreed with a local chimney sweeping company.

The ECOCONDENS NEX boilers can be installed as type C or B equipment, whereas:

- Type C – it is equipment in which the combustion system (air supply, combustion chamber, heat exchanger and combustion products discharge) is sealed in relation to the room where the equipment is installed.
 - C13 – equipment designed to be connected with ducts through a horizontal terminal that simultaneously supplies air to the burner and discharges combustion products to the outside through openings that are concentric or close enough so that wind conditions do not affect them.
 - C33 – equipment connected with two ducts to a vertical terminal that supplies combustion air and discharges combustion products through openings that are either concentric or close enough so that wind conditions do not affect them.
 - C43 – equipment connected by two ducts to a common chimney system designed for more than one piece of equipment. This common system consists of two ducts connected to a terminal that simultaneously supplies combustion air and discharges the combustion products to the outside through openings that are concentric or close enough so that wind conditions do not affect them.
 - C53 – equipment connected by separate ducts to separate terminals that supply combustion air and discharge combustion products. These ducts may terminate in zones with different pressures.
 - C63 – equipment designed for connection to a separately approved and sold air supply and combustion products discharge system. The appliance is not intended for connection to common overpressure duct system (with more than one appliance connected to a single flue duct).
 - C83 – equipment connected by one duct to a single or common chimney system. The chimney system consists of a single duct with a natural draught that discharges the combustion products. The equipment is connected by a second duct to a terminal that supplies combustion air from outside the building.
 - C93 – equipment designed for connection of the flue pipe to a vertical terminal and the air duct to an existing vertical pipe. The terminal simultaneously supplies fresh air to the burner and discharges combustion products to the outside through openings that are concentric or close enough so that wind conditions do not affect them.
- Type B – it is equipment to be connected to a flue gas discharge duct that discharges the combustion products outside the room in which the equipment is installed. Combustion air is drawn from the room.
 - B23 – an equipment designed to be connected to a flue gas discharge duct that discharges the combustion products outside the room in which the equipment is installed. Combustion air is drawn from the room.

For boilers of the ECOCONDENS NEX type, there are 3 different dimension series of balanced flue systems, i.e. a concentric system Ø80/Ø125 and Ø60/Ø100 and a separate one 2 x Ø80.

Each system should be installed with the windproof outlet protecting against external factors.

Caution:

The boiler is factory-adjusted to the concentric balanced flue system Ø60/Ø100 with a pipe length of 3 m + elbow. O₂ setting ~5%. The use of other systems and longer lengths require the boiler adjustment. After commissioning, check the correct boiler operation, and the concentration of CO₂ and/or O₂ in the flue gas.

When using concentric coaxial pipes Ø80/Ø125, it is necessary to use a concentric reducer Ø60/Ø100 x Ø80/Ø125 to the boiler adapter Ø60/100 or replace the installed adapter Ø60/100 and reduction ring Ø60/80 with an adapter Ø80/Ø125 (insert the flue pipe Ø80 as far as it will go to the heat exchanger). Adapters connecting the boiler to the piping system must be provided with test connections.

If separate concentric coaxial pipes 2 x Ø80 are used, a TWIN type distribution manifold must be installed downstream the built-in concentric adapter Ø60/100 with test connections.

The methods of connecting the boiler to the balanced flue system are shown in example figures 3.8.

Individual components of the balanced flue systems are consistent with table 7.1.

The balanced flue kits are sold according to the current TERMET offer. Kit components are not included in the boiler equipment.

To ensure proper operation of the boiler with a balanced flue system, it is necessary to:

- maintain a distance of no more than 1.5m between two supports of the horizontal installation of the balanced flue system,
- limit the maximum length of the external terminal ducts to the length not exceeding 10 times their diameter, maximum 1 m,
- use the balanced flue systems with plastic flue pipe only inside the building,
- use appropriate duct dimensions (diameter, max length, elbow resistance) depending on the flue gas system used. The dimensions of the ducts used should be compliant with those specified in table 3.8, as appropriate.

Table 3.8.a

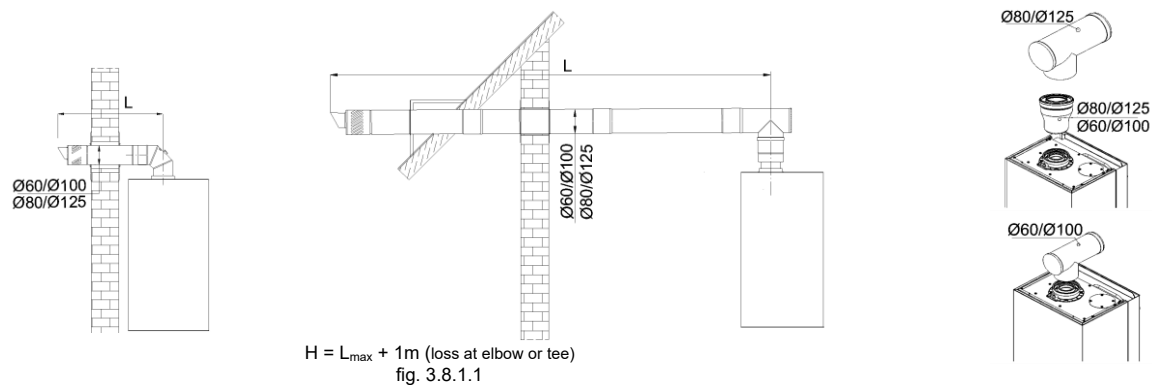
Type of boiler	Concentric system		Separate ducts system
	Ø60/Ø100	Ø80/Ø125	Ø80xØ80
	Flue duct length H		
ECOCONDENS NEX -24; ECOCONDENS NEX -24/30;	12 m	25 m	50 m
ECOCONDENS NEX -28; ECOCONDENS NEX -32; ECOCONDENS NEX -28/35	12 m	20 m	40 m

The resistance of flue gas flow at each elbow depending on the bend angle and the associated reduction in maximum duct length is shown in the table below.

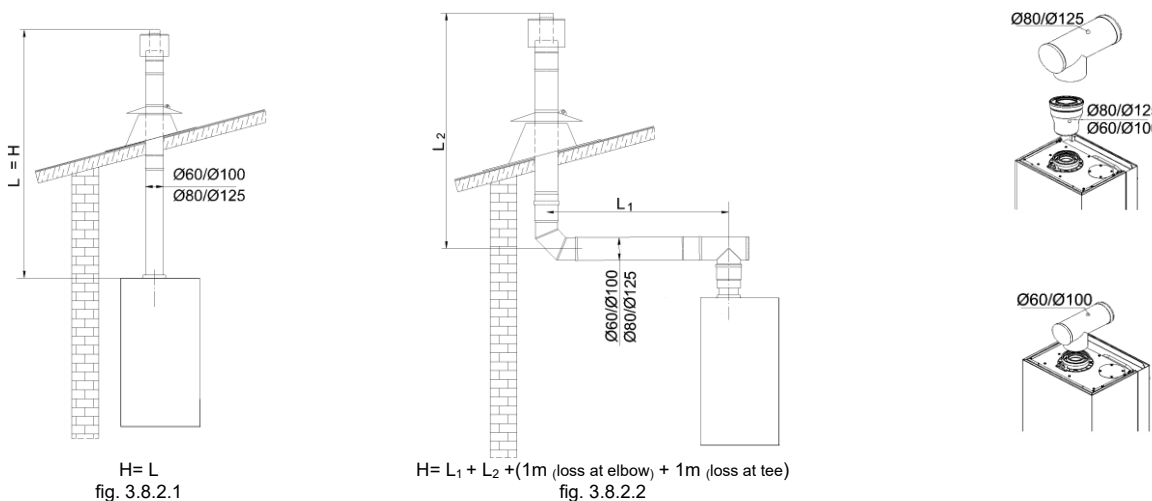
Table 3.8.b

Reduction of the maximum length of the balanced flue system depending on the elbow used		
elbow 15°	elbow 45°	elbow 90°
0.25 m	0.5 m	1 m

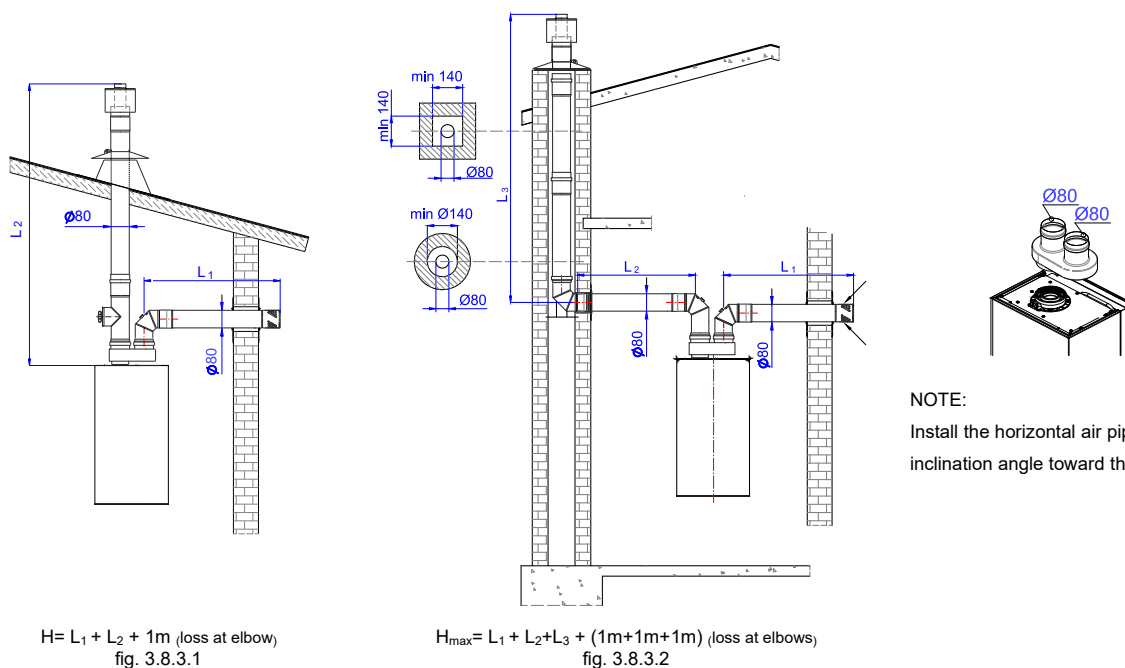
3.8.1 Concentric balanced flue system (C13) with a horizontal outlet through an external wall or roof.



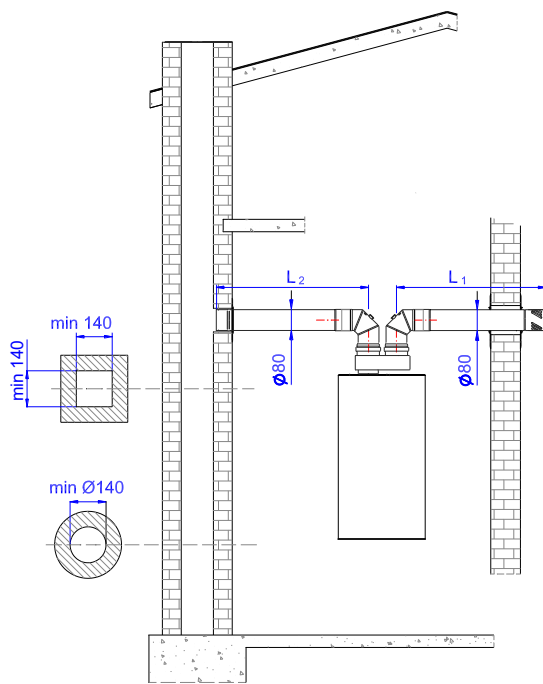
3.8.2 Concentric balanced flue system (C33) with a vertical outlet through flat and sloping roofs.



3.8.3 Balanced flue system (C53) with separate flue gas discharge ducts and air supply ducts

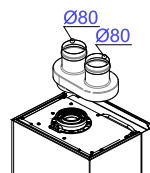


3.8.4 Balanced flue system (C83) with separate ducts, flue gas discharge to be connected to a single or common chimney system with a natural draught that discharges the combustion products and supplies air from outside the building.



$$H = L_1 + L_2 + (1m + 1m) \text{ (loss at elbows)}$$

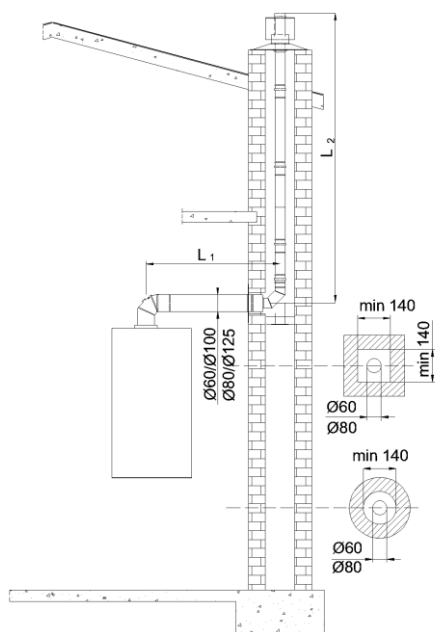
fig. 3.8.4.1



NOTE:

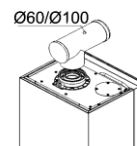
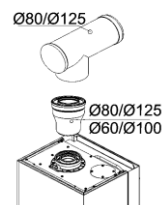
Install the horizontal air pipe at a ~3° inclination angle toward the boiler.

3.8.5 Concentric balanced flue system (C93) to be connected to a flue gas discharge duct laid in a shaft. Combustion air is supplied through a shaft.



$$H = L_1 + L_2 + (1m \text{ loss at elbow}) + 1m \text{ (loss at tee)}$$

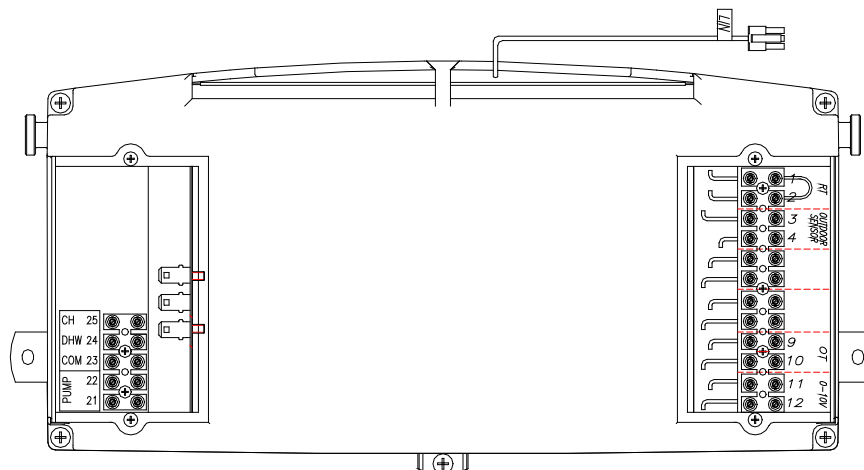
fig. 3.8.5.1



3.9. Connection of additional devices

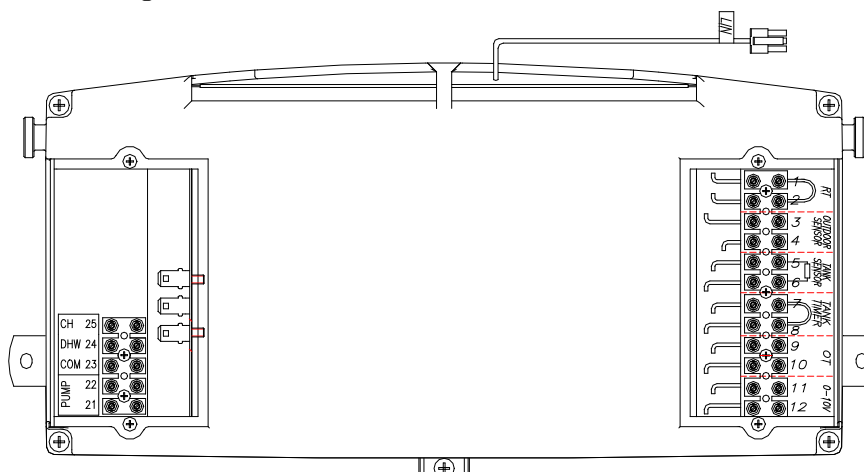
On the back of the controller there are two flaps under which there is access to electrical terminals.

To connect an additional device unscrew the appropriate flap, put the cable through the bushing in the flap and connect the ends of the wire to the correct terminals.



RT – room temperature controller, **OUTDOOR SENSOR**– outdoor temperature sensor,
OT – OpenTherm regulator, **0-10V**- control signal in the range of 0 do 10V, **LIN** – connection to the Comfort module;

Fig.3.9.1a Electrical terminals controller in combi boilers



RT – room temperature controller, **OUTDOOR SENSOR**– outdoor temperature sensor,
OT – OpenTherm regulator, **0-10V**- control signal in the range of 0 do 10V, **LIN** – connection to the Comfort module;
TANK-SENSOR – tank temperature sensor, **TANK-TIMER**- tank time regulator

Fig.3.9.1b. Electrical terminals controller in system boilers

3.9.2. Connection of a room temperature regulator

3.9.2.1. Room regulator with contact.

The boiler has been designed to cooperate with a room temperature control unit which has got its own supply source and control contact free from potential. Connections must be made according to the instructions of regulator manufacturer. In order to connect the temperature thermostat to the boiler the appropriate length two-core wire is needed (2x0,5mm² 50m max). It needs to be connected to terminals 1 and 2 (RT) located under the right flap (→ Fig. 3.9.1) - previously separating the electrical bridge.

To connect room temperature regulator to the boiler we advise to contact a qualified person or AUTHORIZED INSTALLER.

3.9.2.2. OpenTherm room regulator

The boiler has been designed to work with a OpenTherm remote control device. The connection should be made according to the instructions of regulators' manufacturer. OpenTherm room temperature regulator should be connected to the boiler through 2-core cable (2x0,5mm², 50m max) to the connector 9 and 10 (OT) located under right flap of control panel (see fig. 3.9.1), after removing the jumper from connector 1 and 2 (RT).

If OpenTherm regulator has a domestic water heating function, then in system boilers it is recommended to remove the jumper from connector 7 and 8 (TANK TIMER). It will allow for controlling time of water heating in the storage tank via OpenTherm regulator.

To connect room temperature regulator to the boiler we advise to contact an AUTHORIZED SERVICE or AUTHORIZED INSTALLER.

3.9.2.3 Internet Remote Control

Remote control of the boiler is possible with basic package of „Termet Comfort“ remote control system. Such solution is dedicated for boilers equipped with LIN interface, that is used in this boiler family.

Note: „Termet Comfort“ System requires broadband Internet connection using WiFi 2.4 GHz.

Basic package of "Termet Comfort" System consists of following items: (see table 7.1)

- Comfort Module (gateway)
- Comfort Thermostat

Comfort Module must be connected to the boiler using cable marked LIN coming out of the boilers control panel.

The system has the ability to monitor the operation of the boiler and to change settings with free dedicated application - System Termet Comfort. Application is available in Google Play Store (for Android platform) and iTunes Apple (for iOS platform).

Note: For proper operation of the Comfort Module, remove the electrical bridge from terminals 1 and 2 (RT) in boilers control panel, see pic. 3.9.1. If the boiler is used with DHW tank, remove electrical bridge from terminals 7 i 8 (TANK-TIMER) to use scheduling function for DHW heating.

Connecting of the Comfort Module could only be carried out by AUTHORIZED SERVICE or AUTHORIZED INSTALLER.

More information is available on our webpage: <https://www.termet.com.pl/en/produkt/basic-package-quot-comfort-system-quot/126>

"Termet Comfort" System could be expanded with dedicated accessories available in Termet S.A. offer.

Above package is not a part of the boiler packaging, but is available separately.

3.10. Connecting the outside temperature sensor

To connect the outside temperature sensor use the 2 wire cable (2x0,5mm² 50m max) and connect it to terminals 3 and 4 (OUTDOOR SENSOR) located under the right flap → Fig. 3.9.1. Connection must be made in accordance with the instructions provided by the sensor manufacturer. It is the best to place the outside temperature sensor on the north wall of the building and it should not be exposed to direct sunlight.

3.11. Connecting the regulator with 0-10V signal

Boiler allows to connect the regulator with 0-10V signal. Such signal is translated into RT high state and target value of modulation temperature (SETP).

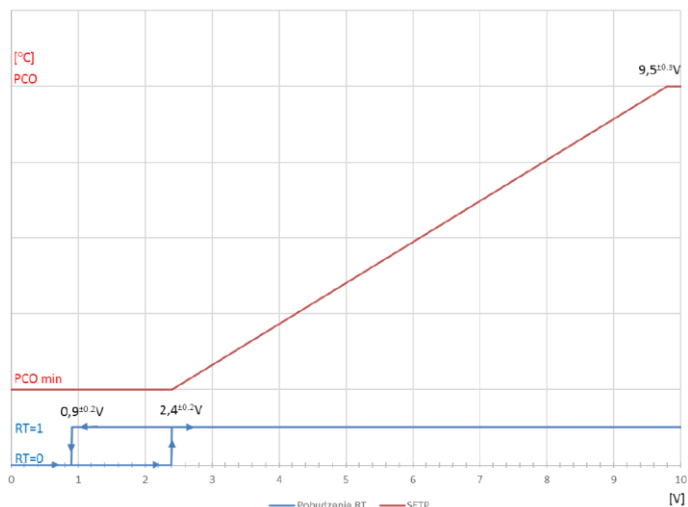
SETP value can change in range described by the value of minimal C.H. temperature set (PCOmin) and the currently set C.H. temperature (PCO) value according to the diagram.

PCOmin	Nominal temp. range 40°C	Reduced temp. range 25°C
--------	-----------------------------	-----------------------------

If the weather regulator is active (parameter P26>0 and is not deactivated via connected OpenTherm regulator), then based on the outdoor temperature and Kt factor, it modifies the upper boundary value of C.H. circuit temperature (PCO).

Notice:

1. If the OpenTherm regulator is connected, then 0-10V regulator is not active.
2. While using 0-10V regulator, RT connectors must be free of electrical bridge and stay disconnected.



4. BOILER ADJUSTMENT AND PRELIMINARY SETTING

4.1. Introductory remarks

Purchased boiler is factory adjusted according parameters for the type of gas that is provided on the rating plate and in the documentation of the boiler. Only AUTHORIZED FACTORY SERVICE can do any and parameter settings of the boiler if there is any need to change the parameters or to adjust the boiler to another type of gas.

4.2. Adjusting the boiler to combust another type of gas

The boiler can be adjusted to combust another type of gas but only for this one which the boiler is certified for. The types of gases are given on the rating plate - in the index designation: **Categorie II2H3P**

Adapting the boiler to combust another type of gas can be performed only by QUALIFIED SERVICE. This operation is not included in the warranty repairs.

4.3. Fan characteristics

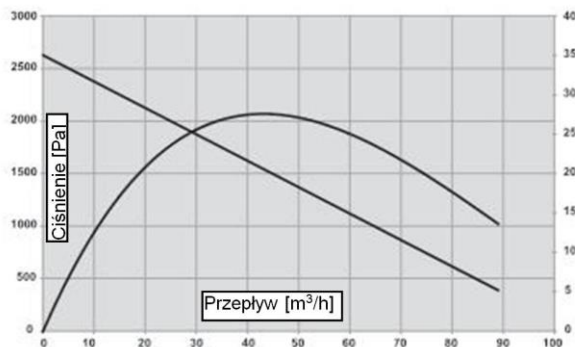
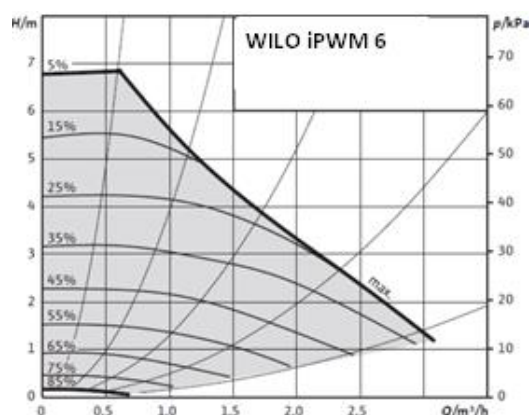


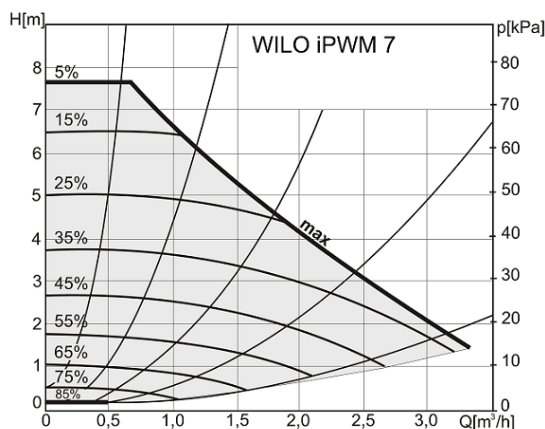
Fig.4.3.1. Characteristic of the fan- type PX118

4.4. Pump characteristics



Pump characteristic for boilers EcoCondens NEX 24; 28 and 24/30.

Fig. 4.4.1. Pump characteristic



Pump characteristic for boilers EcoCondens NEX 32 and 28/35 .

5. STARTUP AND OPERATION OF THE BOILER

5.1. Initial startup of the boiler

After installing the boiler, checking the accuracy and tightness of its connections and preparing for operation in accordance to this instruction manual and applicable regulations first commissioning and user training for boiler operation and safety devices may be done only by AUTHORISED SERVICE

5.2. Inclusion and operation

All boiler functions are performed by the boiler electronic control panel. Changing the operating mode and settings is done done by 7 buttons. Current state of the boiler is shown on the LCD display.

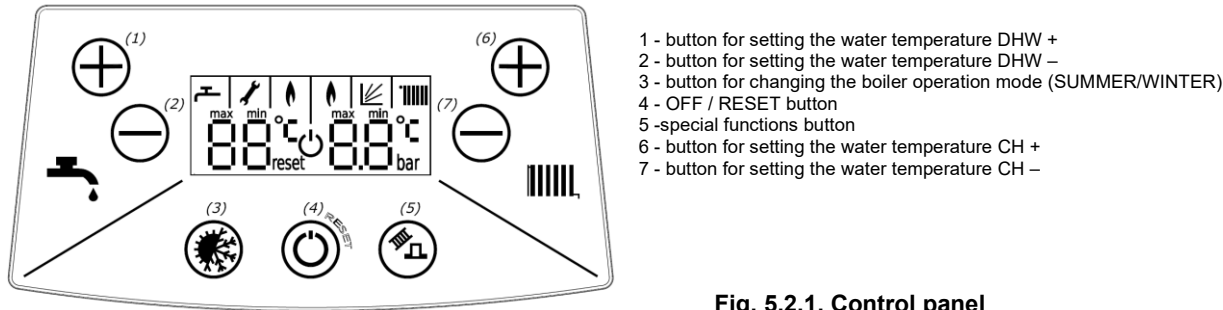


Fig. 5.2.1. Control panel

- Check the pump,
- Connect the boiler to the electrical mains,
- Open the gas valve and water valves,
- Wait until the boilers enters auto-diagnostics mode.
- Set the mode WINTER or SUMMER (→ section 5.3)

The turning on of the boiler in the heating season

- Set the desired temperature of the heating water using buttons + [6] or – [7] in the range of 40°C to 80°C
- The spark generator will cause ignition of gas outflowing from the burner.
- Set the desired water temperature using buttons + [1] or – [2] in the range of 30°C to 60°C. Remember! The priority is always to obtain domestic hot water during operation of the boiler

When the room temperature controller is connected, set desired room temperature on the controller.

5.3. Operating modes of the controller

Mode	Display	Changing the operatingmode	Performed functions
STAND-BY		To turn on /turn off the controller press the reset [4] button for about 2 seconds	• anti-freezing function: the boiler is switched on when the boiler water temp. drops below 8°C and heats the water as long as the temperature reaches 20°C • protection against pump blocking (pump is switched on 180 sec every 24 hours) • 3-way valve blocking protection (valve is switched on 15sec. every 48 hours)
WINTER		Press [3] button for about 1 second - changing the operating mode to mode SUMMER	• CH and DHW heating, • Anti-legionellafunction- active only for boilers with tanks
SUMMER		Press [3] button for about 1 second - changing the operating mode to mode WINTER	• D.H.W. heating, • Anti-legionellafunction- activeonlyfor boilers with tanks,
VENTING		Support the venting of heating system Each time, after voltage supply and after completion of the fan calibration procedure, the controller automatically starts a special procedure to support venting of the heating system (sec.5.4.6). The venting procedure can be manually interrupted at any time by pressing [6] and [7] buttons	

5.4. Signalization of operation states and diagnostics

When the power is switched on, display shows successively:

- **b1** symbol and controlboard software version number,
- **b2** symbol and display software version number,
- **1F** or **2F** marking indicating the type of configuration (for system or combi boilers),
- flashing symbol  with '**max**' inscription indicating the execution of start-up procedure.

After the start-up procedure is completed, the controller switches to the venting procedure (see section 5.4.6).

Afterwards, controller switches to the readiness to accept user commands

Symbol on the display	Signalization	Remarks
	CONTROLLER RESTART	The controller has started working after power has been switched on or after the emergency lock reset.
	BURNER IS OPERATING	Left flame: DHW mode operation. Right flame: CH mode operation.
	WEATHER FUNCTION IS ACTIVE	During the CH setting changing, instead of the temperature the value of Kt parameter is displayed for example: 5.2 without symbol: °C. Note: This symbol flashes if the OpenTherm regulator is connected which means that weather function is performed via OpenTherm regulator. In this case, change of the CH setting is performed according to point 5.5.1.
	CHANGING C.H. SETTING	During changing the CH setting the symbol flashes with the set value.
	CHANGING DHW SETTING	During changing the DHW temperature setting the symbol flashes with the set value.
MAX	MAXIMUM SETTINGS	Maximum setting value is reached. If you exit the setting changes mode the symbol is blanked.
MIN	MINIMUM SETTINGS	Minimum setting value is reached. If you exit the setting changes mode the symbol is blanked.
flashing 	PAUSE IN C.H. HEATING	Displayed symbol means a pause in C.H. heating in time determined by parameter P25 (default 3 min) for heat exchanger cooling when C.H. temperature exceeds the hysteresis value (parameter P20, default 5°C) of the setting. Pump operation will be stopped if the following conditions are met: • no signal „HEAT“ from room temperature regulator, • heating water temperature dropped by 5°C from the set value • 180 sec. have passed after burner switching off
	• SERVICE FUNCTION • PARAMETERS CHANGING • SYGNALISATION OF EMERGENCY SITUATIONS	The symbol can indicate different situations. It appears: • when service function is active • during controller configuration • during signalisation of emergency situations → 5.8
RESET	SWITCHING OFF THE BOILER WITH LOCK	After removing the cause of the failure to restart the boiler operation, use the reset [4] button. Anti-freezing function is performed only by pump operation.
Po	SUPPORT THE VENTING OF HEATING SYSTEM	→ section 5.4.6. Venting procedure can be stopped manually at any time by pressing the buttons '+' and '-' at the same time.

5.4.1. Signalisation of the start of heating in CH or DHW system

At the moment of starting the heating in the CH system or DHW system, the display shows the set temperature of CH or DHW for 4 seconds, also diode at symbol of temperature and the symbol of circuit is flashing.

5.4.2. Signalisation of anti-freezing function operation in STAND BY mode

When the operation of anti - freezing function in the CH system in standby mode is started - the pressure value on the display is replaced by a value of temperature in the central heating circuit. When the anti-freezing function operation starts in DHW circuit - display shows the temperature value in DHW circuit.

5.4.3. Displaying the water pressure in CH installation

When the boiler is set to STAND BY mode, the water pressure in the heating system is displayed on the display continuously. In the SUMMER or WINTER mode temporary pressure display follows after a short pressing the **reset [4]** button.

5.4.4. Displaying parameters

To display additional parameters (in different mode than STAND-BY), press **reset [4]** button.

1. At first, display shows the C.H. water pressure for 2.5 sec.,
 2. Next, for another 2.5 sec.:
 - when C.H. circuit is heated and during standing in WINTER mode, on the left field display shows "In" and on right field the value of return C.H. temperature. If the sensor is not connected, display shows "--",
 - when D.H.W. circuit is heated and during standing in SUMMER mode, on the left field display shows „Ch“ and on right field the value of C.H. temperature,
 3. Next, for another 2.5 sec. on the left field display shows „Pr“ and on right field the value of % pump flow (for traditional pump display shows "--") ,
 4. At the end, for 2.5 sec. on the left field display shows „Fr“ and on right field the value of % fan flow.
- Display stops showing parameters automatically or after another press **reset [4]** button.

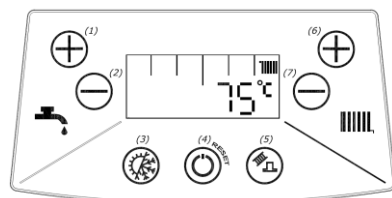
5.4.5. DHW heating blockade indicator for one-function boilers

One - function boilers do not realize heating water in the tank and displays the symbol '-' on the left field of the display when the timer TANK-TIMER terminals are open (see section 3.9)

5.4.6. Support the venting of heating system

Each time, after voltage supply and after completion of the fan calibration procedure, the controller automatically starts a special procedure to support venting of the heating system. It consists of successive six cycles: switching on the pump for 15 sec. and switching off the pump for 15 sec. alternately in CH and DHW circuit. Lock of heating is established during the procedure. Activity of the procedure is signaled by Po code, key symbol and pressure of CH indication. Control system activates the standard pump cycle in CH circulation for a specified period after the procedure (180 sec.). After pressure increasing, venting procedure is activated with lock of heating at the time of its implementation if during the operation of the device, CH pressure drops below the allowed lower bound (which will be signaled by E9 code alternately with pressure indication).

5.5. Changing the CH or DHW temperature settings



5.5.1. Temperature settings in CH circuit

- 1) After a short pressing + [6] or - [7] button, controller enters the CH settings mode. Flashing CH temperature is displayed on the right side of the display.
- 2) Buttons + [6] or - [7] enable to change the value of CH setting. Completion of the operation changes mode is done automatically after 5 seconds of inactivity or after pressing the **reset** [4] button.

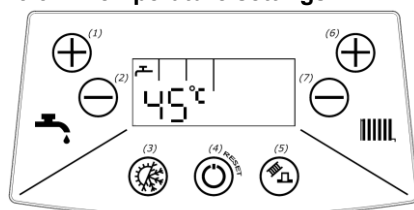
5.5.1.1. Changing value of the Kt coefficient

When the weather function is active (outside temperature sensor is connected and OpenTherm regulator is not connected), then during changing temperature adjustment in C.H. system, the value of the set parameter Kt is displayed instead of the temperature value, e.g.: 5.2 without the °C symbol.

5.5.1.2. Changing a parameter ECO

If the boiler is equipped with a pump with adjustable speed and is set to ECO mode (sec.2.4.5) the values of ECO can be changed. In WINTER operation mode, hold for 2 seconds the + [1] or - [2]. On the left side you will see blinking symbol 'Ec' and on the right side the blinking value ECO eg. 0.5. By the buttons + [1] or - [2] the value of the parameter can be change. Exit of parameter change mode is automatically after 3 seconds of inactivity or after pushing button **reset** [4].

5.5.2. Temperature settings in DHW circuit



- 1) A short pressing buttons + [1] or - [2] causes the activation of the D.H.W. settings mode. The value of D.H.W. temperature is flashing on the left side of the display.
- 2) Buttons + [1] or - [2] enable to change the value of D.H.W. setting. Completion of the operation changes mode is done automatically after 5 seconds of inactivity or after pressing the **reset** [4].

NOTICE:

1. In the case of system boilers, reducing the setting DHW results in stopping the water heating in the tank (below the value indicated on the display by symbol "MIN"). In the left field of display you can see the symbol „—“. To switch on again the function of heating water in the tank it is necessary to increase the setting to the minimum value or higher.

2. When the controller is in STAND BY mode, service function mode, or in state of emergency blockade then the setting of C.H. and D.H.W. cannot be changed.

5.6. Controller configuration – boiler parameters setting

It is possible to change the following parameters of the boiler through the procedure of programming.

Entering the programming mode and changing the settings of the boiler parameters is only accessible to an AUTHORISED SERVICE.

5.7. Interruption in boiler operation

- leave the boiler connected to power supply,
- leave the gas valve and water valve of CH open,
- set the mode on STAND BY (→ section 5.3)

In such conditions the controller of the boiler has a protective function described in point 5.3 - "Performed functions"

If you decide to discontinue use of the boiler for a long time you should:

- set the mode on STAND BY (→ section 5.3)
- drain the water system of the boiler and also CH system if there is possibility of freezing, by using drain valve → pos. 33 fig. 2.2.1.1 and 2.2.1.2.
- close the water and gas valves and disconnect the boiler from power supply.

NOTICE: In a winter time (because of the risk of freezing water in the system) the disconnection the boiler from electrical system is forbidden (if there is still water in the water system of the boiler).

5.8. Diagnostics

5.8.1. Signalisation of error codes during the emergency procedures implementation

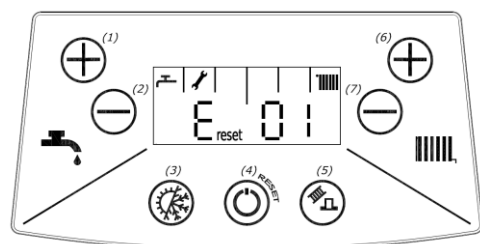
During the implementation of emergency procedures a constant error code is displayed consisting of letter "E" and two digits. Symbols  and „RESET" are blanked. If the emergency procedure is successfully completed the boiler will automatically return to normal operation and the error code disappears. The negative result of the emergency procedure causes emergency **switching off with the blockade**.

5.8.2. Signalisation of error codes in emergency situations without locking

In the emergency situation without a blockade, the flashing symbol  and the error code consisting of letter "E" and two digits are displayed. Symbol „RESET" is blanked.

In particular cases the error code can be displayed alternately with the temperature or pressure value in the CH circuit. After removing the cause of the failure the boiler will automatically return to normal operation and the error code disappears.

5.8.3. Signalisation of emergency switching off with locking



Emergency lock is indicated by displaying the error code and flashing symbols  and „RESET". Return to normal operation is possible after removing the cause of failure and after press the **reset** button.

If the boiler will continue to block we advise you to contact AUTHORISED SERVICE.

The figure shows an example of display with error code E 01 with symbols **reset** and .

5.8.4. Error list

Error code	Error cause	Way of error removing
 E 01	No flame on the burner: 3 automatic reignition attempts are taken. Each attempt is preceded by 15 sec. break for ventilation of the boiler. After the failure of attempts follows: switching off the boiler with blockade, displaying the symbol E^{RESET} 01	The boiler is in the process of gas ignition tests and will return to normal operation
 E _{reset} 01	No flame on the burner: Turning off the boiler with blockade after unsuccessful attempts of gas ignition. The reason of failure may be: 1. Lack of gas.	Check if the gas cocks are opened and if the gas reaches the boiler. Press reset button
	2. Erroneous connection to power source (phase detection)	To fix: - turn off power - switch lines of power cable
 E _{reset} 02	The water temperature in the gas-water heat exchanger exceeds 95°C. The boiler is turned off with a blockade.	Press reset button
 E _{reset} 03	The flue gas temperature has exceeded the permitted value. The one-time thermal fuse was burned off and the boiler was switched off with blockade.	Call Authorized Service
 E 04	Damage in the circuit of NTC sensor of heating water temperature. The burner is turned off.	Call Authorized Service
 E _{reset} 06	Failure in the electronic system of the boiler. The burner is turned off	Call Authorized Service
 E _{reset} 07	Failure of the measuring system of fan speed or failure of the fan.	Call Authorized Service
 E 08	Failure of water pressure transducer (in CH system) The burner is turned off, the pump operates for 180 sec.	Call Authorized Service
 E 09	Incorrect pressure in CH system. if: P > 2.8 bar - controller turns off the burner, the pump operates for 180 sec, P < 0.5 bar - controller turns off the burner, the pump operates for 180 sec, if: P ≤ 2.5 bar - return to the normal operation. P ≥ 0.5 bar - return to the normal operation.	When the pressure in CH is higher than 2.8bar some water should be drained from installation. The pressure may be too high if there has been too high initial pressure in the system or if there occurred damage in the compensation vessel. If the pressure in the CH system is below 0.5bar you should fill in the system with water and check for leaks
 E 10	Failure in the circuit of NTC temperature sensor (in DHW system). The burner is turned off.	Call Authorized Service
 E _{reset} 13	Overrun of the maximum number of consecutive emergency situations E1 after earlier detection of flame.	Press reset button
 E 14	Missing or damaged sensor heating water (return) during the water heating in the CH circuit with active mode of PWM pump. Error code is displayed alternately with the temperature of heating water leaving the boiler. Pump operates at a constant maximum speed specified by parameter P18.	Call Authorized Service

	Return water temperature above 95°C (only boilers with PWM pump) Boiler is switched off with lockout	Check if water valves are open. Check if filters are clean. Press reset [4] button
--	---	---

6. MAINTENANCE, INSPECTIONS, CHECKING OF THE OPERATION

6.1. Inspection and maintenance

The boiler should be regularly serviced and subjected to maintenance.

At least once a year it is recommended to perform a service and it should be reviewed before heating season.

All service and maintenance works should be performed by an Authorized Person. Only original parts should be used for boiler repairs.

At every service and maintenance works the tightness of the gas units and gas installation and correctness of the protective systems should be checked. The warranty does not cover above mentioned operations.

6.2. The maintenance operations to be performed by the user

User should:

- clean the water filter periodically, preferably before the heating season (should be replaced when used),
- clean the domestic water filter also in case of finding decreasing flow,
- refill the central heating system with the water,
- vent the CH system and the boiler,
- periodically clean the boiler cover with the water with detergent (avoid cleaners that cause scratches).

6.3. Range of technical maintenance performed by service

- maintenance of the main heat exchanger;
- maintenance of the burner;
- boiler inlet water filter cleaning;
- cleaning the gas filter on the boiler inlet;
- checking the operation of the protection which monitoring the correct operation of the fan;
- checking the operation of the protection against exceeding the upper limit water temperature;
- check of operation of the protection against overheating of water - operation of the modulator;
- checking the operation of the room temperature controller;
- checking operation of heating water temperature controller;
- checking the operation of the domestic water temperature controller;
- checking of temperature sensors;
- checking the operation of water pump
- Checking the condition of the magnesium anode in the storage tank (in boilers with a connected storage tank)

7. BOILER EQUIPMENT

In table 7.1 there is placed a list of parts required for installation of the boiler, its proper operation and for enhancement the comfort of usage of the product. The following items are available for purchase together with the boiler or are supplied with the boiler.

Table 7.1.

Basic kit						
No.	Name	Drawing number Type Code	INDEX	Quantity	Refers to the boiler:	Remarks
1	2	3		4	5	6
1.	wood screw 8 x 70			2	ECOCONDENS NEX	In boiler equipment. Put in the package of the boiler.
2.	Sparing sleeve			2		
3.	Adhesive spacer EPDM	1780.00.00.49		4		
4.	Tank NTC sensor	0960.00.10.00		1	ECOCONDENS NEX (system boilers)	
5.	Subassembly of gas connector	0696.00.00.00		1 kpl	ECOCONDENS NEX	
PURCHASE RECOMMENDED TO IMPROVE COMFORT OF THE BOILER USAGE						
6.	Room temperature regulator: Any contact or OpenTherm remote control menu PL, GB, DE typ CR11011	T9449.11.00.00 or T9449.10.00.00 or WKZ0624.00.00.00		1	ECOCONDENS NEX	Not included in boiler equipment.
7.	Outdoor temperature sensor	WKC 0566.00.00.00 or WKC 0567.00.00.00		1		
8.	Comfort Module (Gateway)	T9660.01.00.00		1		
9.	Comfort Thermostat	T9660.02.00.00		1		
10.	Magnetic filter for central heating system			1		
PURCHASE NECESSARY TO ENSURE THE PROPER OPERATION OF THE BOILER						
11.	Gas filter			1	ECOCONDENS NEX	Not included in boiler equipment.
12.	Heating water filter			1		
13.	Domestic water filter			1		

BOILER BALANCED FLUE SYSTEM (plastic ducts)					
Flue gas system diagram	Flue gas system type	Name of the balanced flue system component	INDEX	Number of pieces entering the boiler	Remarks
Fig. 3.8.1.1	C13	Balanced flue kit – concentric system Ø80/Ø125			Additional equipment of C13 type boiler is sold according to the current offer.
		Reducing elbow with revision ø60/100 x ø80/125	T 9000 04 01 16	1	
		or			
		Concentric reducer ø60/100 x ø80/125	T 9000 04 01 34	1	
		Elbow 87° with cleanout ø80/125	T 9000 04 01 15	1	
		System components (according to the system design)		1 kit	
		Balanced flue kit – concentric system Ø60/Ø100			
		Elbow 87° with cleanout ø60/100	T 9000 04 01 14	1	

BOILER BALANCED FLUE SYSTEM (plastic ducts)					
Flue gas system diagram	Flue gas system type	Name of the balanced flue system component	INDEX	Number of pieces entering the boiler	Remarks
		System components (according to the system design)		1 kit	
Fig. 3.8.2.1	C33	Balanced flue kit – concentric system Ø80/Ø125			Additional equipment of C33 type boiler is sold according to the current offer.
		Concentric reducer ø60/100 x ø80/125	T 9000 04 01 34	1	
		System components (according to the system design)		1 kit	
		Balanced flue kit – concentric system Ø60/Ø100			
Fig. 3.8.2.2	C33	System components (according to the system design)			Additional equipment of C33 type boiler is sold according to the current offer.
		Balanced flue kit – concentric system Ø80/Ø125			
		Reducing elbow with revision ø60/100 x ø80/125	T 9000 04 01 16	1	
		or			
		Concentric reducer ø60/100 x ø80/125	T 9000 04 01 34	1	
		Elbow 87° with cleanout ø80/125	T 9000 04 01 15	1	
		System components (according to the system design)		1 kit	
		Balanced flue kit – concentric system Ø60/Ø100			
Fig. 3.8.3.1 Fig. 3.8.3.2	C53*	Elbow 87° with cleanout ø60/100	T 9000 04 01 14	1	Additional equipment of C53 type boiler is sold according to the current offer.
		System components (according to the system design)		1 kit	
		Balanced flue kit – separate ducts system Ø80 x Ø80			
Fig. 3.8.4.1	C83*	Air-flue gas separator ø60/100 x 2x ø80	T 9000 04 01 33	1	Additional equipment of C83 type boiler is sold according to the current offer.
		System components ø80 (according to the system design)		1 kit	
		Balanced flue kit – concentric system Ø80/Ø125			
Fig. 3.8.5.1	C93	Reducing elbow with revision ø60/100 x ø80/125	T 9000 04 01 16	1	Additional equipment of C93 type boiler is sold according to the current offer.
		or			
		Concentric reducer ø60/100 x ø80/125	T 9000 04 01 34	1	
		Elbow 87° with cleanout ø80/125	T 9000 04 01 15	1	
		System components (according to the system design)		1 kit	
		Balanced flue kit – concentric system Ø60/Ø100			
		Elbow 87° with cleanout ø60/100	T 9000 04 01 14	1	
		System components (according to the system design)		1 kit	

*Air-flue systems should be installed in accordance with local regulations

BOILER BALANCED FLUE SYSTEM (steel ducts)					
Flue gas system diagram	Flue gas system type	Name of the balanced flue system component	INDEX	Number of pieces entering the boiler	Remarks
Fig. 3.8.1.1	C13	Balanced flue kit – concentric system Ø80/Ø125			Additional equipment of C13 type boiler is sold according to the current offer.
		Reducing elbow with revision ø60/100 x ø80/125	T 9000 04 02 88	1	
		System components (according to the system design)		1 kit	
		Balanced flue kit – concentric system Ø60/Ø100			
		Cleanout tee 87° ø60/100	T 9000 04 02 31	1	
Fig. 3.8.2.1	C33	System components (according to the system design)		1 kit	Additional equipment of C33 type boiler is sold according to the current offer.
		Balanced flue kit – concentric system Ø80/Ø125			
		Concentric reducer ø60/100 x ø80/125	T 9000 04 03 42	1	
		System components (according to the system design)		1 kit	
		Balanced flue kit – concentric system Ø60/Ø100			
Fig. 3.8.2.2	C33	System components (according to the system design)			Additional equipment of C33 type boiler is sold according to the current offer.
		Balanced flue kit – concentric system Ø80/Ø125			
		Reducing elbow with revision ø60/100 x ø80/125	T 9000 04 02 88	1	
		System components (according to the system design)		1 kit	
		Balanced flue kit – concentric system Ø60/Ø100			
Fig. 3.8.3.1 Fig. 3.8.3.2	C53	Cleanout tee 87° ø60/100	T 9000 04 02 31	1	Additional equipment of C53 type boiler is sold according to the current offer.
		System components (according to the system design)		1 kit	
		Balanced flue kit – separate ducts system Ø80 x Ø80			
		Air-flue gas separator ø60/100 x 2x ø80	T 9000 04 02 46	1 kit	
		System components ø80 (according to the system design)		1 kit	
Fig. 3.8.4.1	C83	Balanced flue kit – separate ducts system Ø80 x Ø80			Additional equipment of C83 type boiler is sold according to the current offer.
		Air-flue gas separator ø60/100 x 2x ø80	T 9000 04 02 46	1 kit	
		System components ø80 (according to the system design)		1 kit	
Fig. 3.8.5.1	C93	Balanced flue kit – concentric system Ø80/Ø125			Additional equipment of C93 type boiler is sold according to the current offer.
		Straight connector ø80/125	T 9000 04 07 48	1	
		Cleanout tee 87° ø80/125	T 9000 04 02 32	1	
		System components (according to the system design)		1 kit	
		Balanced flue kit – concentric system Ø60/Ø100			
		Cleanout tee 87° ø60/100	T 9000 04 02 31	1	
		System components (according to the system design)		1 kit	



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