

INSTRUCTIONS FOR USE



Wall hung gas condensing boilers

ATTACK KZT Plus, KST Plus, KT Plus, KT Small Plus

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Introduction

Dear customer,

thank you for choosing the **ATTACK** trademark, the wall hung condensing boilers **ATTACK** with modern design, equipped with modern technology, with increased reliability and construction quality. Read this user manual properly, whereas it contents important information concerning safety at installation, usage and maintenance of the appliance.

The ATTACK Plus boilers are intended for central heating and D.H.W. warming (with built-in 25-litres stainless tank, instantaneous heating or external additional tank) with mixing and condensation at high output level at operation and very low emissions. They use natural gas or propane, equipped and controlled with modern micoprocessor control system.

Boiler body consists from multi-plate exchanger and **mixing** ceramic **burner**, equipped with electronic ignition and ionisation flame control, venilator with modulation of rotations and modulation gas valve.

Control panel of boilers KT Plus, KT small Plus, KST Plus

Pic.1

<u>Control panel</u> Description

- 1 = Button to decrease set temperature of D.H.W.
- **2** = Button to increase set temperature of D.H.W.
- 3 = Button to decrease set temperature of water in central heating system
- 4 = Button to increase set temperature of water in central heating system
- 5 = Display
- 6 = Button to recover original setting regime option Summer/Winter
- 7 = Button to switch regime Economy/Comfort Start/Stop of appliance
- 8 =Symbol of D.H.W.
- 9 = Indication of D.H.W. production
- **10** = Indication of regime Summer
- 11 = Multifunctional indication (flickers during protection function of exchanger)
- 12 = Indication of regime Eco (Economy)
- 13 = Indication of heating function
- 14 = Symbol of heating in heating appliance
- 15 = Indication of operating burner and actual output (flickers during function of Flame protection)

Indication during operation of KT Plus, KT small Plus, KST Plus

Heating

Requirement for heating (generated from room thermostat or Open therm regulator) is indicated by flickering of LED diodes at radiator symbol (see page 13 - pic.1). Display (see page 11 - pic.1) projects actual temperature at the inlet into heating appliance and during waiting time for heating, the **"d2"** text is displayed.

Domestic hot water

Requirement for D.H.W. (activated by taking of D.H.W.) is signalized by flickering of LED diodes by symbol of water tap (see page 8 - pic.1).

Display projects actual temperature at the D.H.W. outlet and during the waiting time for D.H.W., there is a text ,,**d1**".

Disconnection of water heater KT small Plus, KT Plus (economy)

Water warming - i.e. temperature keeping in the water heater can be turned off. In case that you turn this function off, no D.H.W. will be produced.

User can turn the heater off (ECO regime) by pressing ECO/Comfort button (see page 7 - pic.1). In the ECO regime, appropriate yellow control light is turned on (see page 12 - pic.1) To reactivate the COMFORT regime, press the button ECO/COMFORT (poz. 7- obr.1) again.

Comfort of water heating KST Plus

Requirement for Comfort regime (comeback to original internal boiler temperature) is signalized by flickering of LED diodes by symbol of water tap (see page 9-pic.1). Water in exchanger is permanently warmed to temperature of 45°C. Display (see page 11-pic.1) shows actual temperature of water in the boiler.

Start and stop of boilers KT Plus, KT smal. Plus, KST Plus

Boiler start

Connect appliance into electricity mains. The "FH" is displayed within next 120 seconds, which signalizes deareation cycle of the heating appliance. Also the version of the card software is displayed within first 5 seconds. Open the gas valve installed on connection in front of the boiler. After expiration of the FH text is boiler prepared for automatic operation after every usage of the DHW or in case of requirement of the room thermostat.

Boiler stop

Hold button (see 7 - Pic.1) for 5 seconds.

The control electronics remains connected to the electricity mains after the boiler is shut down. Operation of DHW warming and heating is turned off. To turn the boiler on again, hold the button for 5 seconds (see 7 - Pic.1). Boiler will be immediately ready for operation by every DHW usage or by activation per the room thermostat. After interruption of the electrical or gas connection of device is the antifreeze system inactive. During long-time interruption of operation, to avoid of damages caused by frost, it is recommended to release all water from the boiler, DHW and water from supply system, or to release only DHW and fill the supply system with antifreeze mixture that conforms to conditions given in this manual.

Regulation of the boilers KT Plus, KT small Plus, KST Plus

Switching to Summer/Winter

Hold the button for 2 seconds (see 6 - Pic.1).

The Summer sign appears on display (see 10 - Pic.1). Boiler will make only the DHW The antifreeze system remains active. To cancel the Summer mode, hold the button for 2 seconds again (see 6 - Pic.1).

Regulation of the heating water temperature

It is possible to set the temperature from the minimum of 20°C up to the maximum of 90°C by the buttons of heating (see 3 and 4 - Pic.1).

Regulation of the DHW temperature

It is possible to set the temperature from the minimum of 10° C up to the maximum of 65° C by the buttons of DHW (see 1 and 2 - Pic.1).

Setting of the environment temperature (with additional room thermostat)

Set the required temperature in premises by the room thermostat. If the room thermostat is not connected, boiler will keep temperature in supply system at value that was set at the inlet into the supply system.

Setting of the environment temperature (additional OpenTherm regulator)

Set the required temperature in premises by the *OpenTherm* regulator. Boiler will treat water in device adequately to the required temperature of environment. Farther in this manual you will find instructions for operation with remote control.

Control panel of the KZT Plus boilers





<u>Control panel</u> <u>Description</u>

- 1 = Button to decrease adjusted DHW
- 2 = Button to increase adjusted DHW
- 3 = Button to decrease adjusted temperature of water in the central heating system
- 4 = Button to increase adjusted temperature of water in the central heating system
- 5 = Display
- 6 = Button for switching to Summer/Winter
- 7 = Button for switching to Economy/Comfort
- $\mathbf{8} =$ Button of reset / fill-in of device
- 9 = On / Off button of device
- 10 = Button of the "Controlled temperature" menu
- 11 = Indication of achieving the required DHW temperature
- 12 = Sign of DHW
- 13 = Indication of DHW production
- 14 = Setting/ temperature at the DHW outlet (flickers during the "Heat exchanger protection" operation)
- 15 = Indication of Eco (Economy) mode or Comfort mode
- 16 = Temperature of the external sensor (with additional external probe)
- 17 = Appears, when the external probe or the remote control is connected (optional)
- 18 = Temperature of environment (per additional remote control)
- 19 = Indication of burner operation and actual output (flickers during function "Flame protection")
- 20 = Indication of operation against frost
- 21 = Indication of pressure in the heating device
- 22 = Error indication
- 23 = Setting / temperature at the heating device inlet (flickers during operation "Exchanger protection")
- 24 = Sign of heating
- 25 = Indication of heating operation
- 26 = Indication of achieving temperature at the heating device inlet
- 27 = Indication of the Summer mode

Indication during heating operation of the KZT Plus

Requirement for heating (activated by room thermostat or remote control) is indicated by flickering of the warm air over space heater sign (see 24 and 25 - Pic.2).

Display (See 23 - Pic.2) shows actual temperature at the heating device inlet and the "**d2**" text during the period of waiting for heating.

Grades of heating (see 26 - Pic.2) light on sequentially, according to achieving of the value set by thermal probe.

Domestic hot water

Requirement for water heating in the boiler is indicated by flickering of the warm water sign - marked as water tap (see 12 and 13 - Pic.2). Display (see 14 - Pic.2) shows actual temperature at the DHW outlet and the **"d1**" during waiting for DHW. Grades of the DHW (see 11 - Pic.2) light on sequentially, according to achieving of the temperature set by the heating device sensor.

Shutdown of the water heater (economy)

Water heating, i.e. keeping water temperature in the storage tank can be shut down. When this function is turned off, no DHW is produced. When the DHW warming is turned on (original setting), text "COMFORT" is diplayed (see15-Pic.2). When it is turned off, text ECO is displayed ("See7-Pic.2"). For activation of the COMFORT mode, press the button again (See 7 -Pic.2).

Start and stop of the KZT Plus

Boiler without electrical connection

Boiler is not connected to the electricity mains

When the electrical or gas connection is interrupted, the antifreeze system does not work. During long-time interruption of operation, to avoid of damages caused by frost, it is recommended to release all water from the boiler, DHW and water from supply system, or to release only DHW and fill the supply system with antifreeze mixture.

Boiler start

Connect boiler to electricity mains.

The "FH" letters will be displayed within the following 120 seconds, which means, that the air is being released form the heating device. During the first 5 seconds is displayed also the card software version. Open the gas valve installed on the connection with boiler.

The "FH" text expires, the boiler is prepared for automatic operation everytime by DHW consumption or by requirement from the room thermostat.

Boiler stop

Hold the button for 1 second (see 9 - Pic.2). When the boiler is shut down, the control electronics remains connected to electricity. Operation of water warming and heating is turned off. The antifreeze system remains active. To start the boiler again, hold the button for 1 second again (see 9 - Pic.2). Boiler will be immediately ready for operation by every DHW consumption or by activation through the room thermostat.

Regulation of the KZT Plus boiler

Switching Summer/Winter

Hold the button for 1 second (see 6 - Pic.2).

The Summer sign appears on display (see 10 - Pic.1). Boiler will make only DHW. The antifreeze system remains active. To cancel the Summer mode, hold the button for 1 second again (see 6 - Pic.2).

Regulation of the heating water temperature

It is possible to set the temperature from the minimum of 20°C up to the maximum of 90°C by the buttons of heating (see 3 and 4 - Pic.2).

Regulation of the DHW temperature

It is possible to set the temperature from the minimum of 10° C up to the maximum of 65° C by the buttons of DHW (see 1 and 2 - Pic.2).

Setting of the environment temperature (with additional room thermostat)

Set the required temperature in premises by the room thermostat. If the room thermostat is not connected, boiler will keep temperature in supply system at value that was set at the inlet into the supply system.

Environment temperature setting (additional time remote control)

Set the required temperature in premises by the time remote control. Boiler will treat water in device adequately to the required temperature of environment. Farther in this manual you will find instructions for operation with time remote control.

Equithermic regulation of the KZT Plus, KST Plus, KT Plus, KT small Plus boilers

After installation of external probe (additional), the external temperature measured by the external probe is displayed on the screen of the control panel (See 5 - Pics.1 and 2).

Boiler regulation system works with the "Controlled temperature". In this mode is temperature of the heating device regulated according to the external climatic conditions to ensure higher comfort and energy savings during the whole year. Moreover, after increasing of the external temperature is the temperature at the boiler outlet decreased according to the concrete " compensation curve". By regulation of the equithermic regulation of temperature, the temperature set by the buttons of heating (See 3 and 4 - Pics.1 and 2) represents maximum temperature at the inlet into the heating device. It is recommended to set maximum temperature to enable system operation within the full interval. Boiler must be set by specialist during the installation. Necessary adjustment for higher comfort can be done by user.

Compensation curve and shift of curves of the condensing boilers <u>Plus</u>

Press button once to display actual compensation curve (See 6 - Pic.1 KST, KT and See 10 - Pic2 KZT). It is possible to change it per DHW buttons (See 1 and 2 - Pic.1 and 2). Adjust the required curve from 1 to 10, adequately to the characteristics. By adjusting curve to 0 is the regulation of the controlled temperature cancelled.

Compensation curve of the Plus condensing boilers

Access to the paralel curves shifting is enabled through heating buttons (See 3 and 4 - Pics. 1 and 2). Flickering text (OF) is displayed. It is possible to change it through DHW buttons. (See 1 and 2 - Pics. 1 and 2).

Parallel shift of the curves of the condensing boilers <u>Plus</u>

Repeated pressing of the button (See 6 - Pic.1 KST, KT) and (See 10- Pic.2 KZT) enables to exit mode of the parallel curve regulation. If the environment temperature is lower than required temperature, it recommended to set more abrupt curve and vice-versa. Decrease or increase for 1 unit and check the result in the room.

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Compensation curve and curve shifting

By holding the "reset" button (See6 - Pic.1 KST, KT) or the "mode" button(See 10 - Pic.2 KZT) for 5 seconds opens the menu of the "Controlled temperature", the flickering "CU" is dipslayed. Adjust the required curve by the DHW buttons (marked as 1 and 2, pics. 1 and 2) from 1 to 10, adequately to the characteristics. Regulation of the controlled temperature is cancelled by adjusting curve to 0. **Compensation curve**



Option of the parallel curve shift, the flickering "Of"is displayed by pressing the heating buttons (See 3 and 4 - Pics.1 and 2). Set the parallel curve shift adequately to the characteristic by the DHW buttons (See 1 and 2 - Pics. 1 and 2).

Compensation curves



Parallel curve shift

Repeated pressing of the button "Reset" (See 6 - Pic.1 KST, KT) and "Mode" (See 10- Pic.2 KZT) for 5 seconds enables to exit mode of the parallel curve regulation. If the environment temperature is lower than required temperature, it recommended to set more abrupt curve and vice-versa. Decrease or increase for 1 unit and check the result in the room.

Regulation with time remote control

If the time remote control (additional equipment) is connected to the boiler, the above mentioned operations are controlled per boiler display and the "FH" text appears.

Regulation of the heating temperature

Regulation can be performed via menu of the time remote control, as well as via the boiler's control panel.

Regulation of the DHW temperature (with external DHW tank installed)

Regulation can be performed via menu of the time remote control, as well as via the boiler's control panel.

Switching Summer/Winter

The Summer mode has priority over the eventual requirement for heating from the remote control. **Selection Eco/Comfort**

If the DHW warming is turned off by the remote control, boiler is switched into the Economy mode. Therefore is the button (See 7 - Pics.1 and 2) on the boiler control panel out of order. If the DHW warming is turned on by the remote control, the boiler is switched to the Comfort mode. Therefore it is possible to set one of the two modes through the button (See 7 - Pics. 1 and 2).

Controlled temperature (OPENTHERM)

The OPENTHERM communication is built into the electronic control board of the boiler. All the boiler functions are controlled through programmable Opentherm regulator (Ordering code: OT36A). Programmable regulator and the room thermostat are not included to the boiler accessories.

Regulation of the hydraulic pressure of the supply device

Pressure indicated on the water-gauge, when the heating system is filled being cold, has to be 1,0 bar. If pressure of device decreases to minumum values, boiler display shows error F 37. Increase pressure in device to value higher than 1,0 bar by using the filling tap (See 1). Manometer indicating pressure without electrical connection is placed in the bottom part of the boiler. When the hydraulic pressure is recovered, boiler activates 120 seconds long ventilation cycle displayed as "FH". Afterwards it is always necessary to close the filling tap (See 1).



Connection to the DHW tank of the KT Plus, KT small Plus boilers

Control electronics of the boiler serves to control the external DHW tank. Make hydraulic connections following the scheme. Make electrical connections following the instructions in the electrical scheme (Page 13). It is always necessary to instal thermal probe for the tank. Boiler control system detects presence of the thermal probe and automatically configures itself, activates display and appropriate control of DHW warming.

Scheme of connection to external tank:

- 8 DHW outlet
- 9 DHW inlet
- 10 Inlet into the heating system (CH flow connection)
- 11 Return flow from the heating system (CH return



210 Return flow from the exchanger of DHW warming



General instructions

BOILER HAS TO BE INSTALLED EXCLUSIVELY BY SPECIALIZED AND TRAINED WORKERS AND ALL THE INSTRUCTIONS GIVEN IN THIS TECHNICAL MANUAL HAVE TO BE KEPT, AS WELL AS ALL THE VALID PRESCRIPTIONS, ALL REGULATIONS FROM THE EN NORMS, ALL STN NORMS, ALL SAFETY PRESCRIPTIONS AND ALL WARNING SIGNS.

Place of the installation

Sphere of combustion of device is totally hermetic to the surrounding environment, and thereby it is possible to install device in any kind of room. It is necessary to have sufficient ventilation in the room, where the boiler is going to be installed to avoid from danger of the gas release (even if small). This safety norm is given by the Ordinance EHS Nr.90/936 for all the gas using devices and also for devices with so called hermetic chamber. The boiler has to be installed in the dustless room, where are no flammable materials or corrosive fumes. Room must be dry and the inside tempreture must not decrease under 0° C. Boiler has to be hung on the wall and therefore it is equipped with the console. Boiler has to be clamped in the way ensuring its stable and efficient position. It is necessary to leave sufficient space for maintenance, in case that the boiler is placed in the corner or if there is a furniture around. By installation, keep safe distance of the boiler surface from flammable materials in dependence on combustibility grade: 100mm

- from materials of the combustibility grade B, C1, C2

- from materilas of the combustibility grade C3

- from materials of the combustibility grade not tested under STN 73 0853 Examples of the building materials sorting by combustible grade:

- combustible grade A - non-combustible (brick, adapting pieces, ceramic tiles, parget, mortar)

- combustible grade B -very hard combustible (heraklith, lignos, boards from basalt felt)

- combustible grade C1 - hard combustible (beech, oak, plywood, werzalit, hard paper)

- combustible grade C2 - medium combustible (pine wood, spruce chipboard, solodur)

- combustible grade C3 - easy combustible (wood-fibre-boards, polyurethane, PVC, molitane, polystyrene)

Solid materials of the combustible grade A can be used as non-combustible and isolation matters. Items made from combustible materials must not be placed on the boiler and in the distance of 500mm from boiler.

Hydraulical connections

The ATTACK boilers are intended for heating systems with forced heating water circulation. Intensity of the water flow can be set by switch on the pump. Before is the heating system filled with water, it is necessary to clean the system properly. It is necessary to flush heating bodies and distribution pipes several times. To flush and clean the system properly it is recommended to use cleansing articles. Filter must be mounted at the inlet into the heating system. It is recommended to use copper filter with side cleaning and it has to be cleaned in regular intervals, depending on system clogging. Due to the maintenance and servicing it is recommended to mount closing valves at the inlet and outlet of central heating and D.H.W. Filter and valves are not delivered as accessories of the boiler. Heating system has to be also equipped with inlet valve (installation with ATTACK KT boiler) with reverse flap, connected to water supply system to fill and pressure the heating system. Boilers ATTACK KST and KZT Plus are equippped with filling valve with reverse flap.

Warranty is not valid for cases of clogging or stucking of exchanger or pump caused by dirts from the system!

Water callosity in the heating system cannot excess 3 mmval/l. In case of exchanger damage caused by boiler operation with water of callosity higher than 3 mmval/l is warranty for exchanger also not valid. Expanse vessel of 7 or 81 installed in the boiler enables connection to the closed heating system. If it is neccessary due to the size of the heating system, it is possible to install additional expanse vessel. There should be difference of 15-20°C between outlet and inlet boiler heating water. In case of reconstruction of the heating system or new system, it is recommended to use low-voluminous heating appliances and distribution pipes in as small dimmensions as possible for quick system temperature reaction and considerable flexibility of the system.

Process of filling with water: boiler has to be disconnected from electricity mains. Open deareation valves on boiler and heating system. System has to be pressurized for at least 1 bar and deareated again. If the pressure decreases, it is neccesary to pressurize it again.

Heating system must conform to valid norms and prescriptions:

STN 06 0310 - projection and installation of the central heating system,

STN 06 0830 - Assurance of appliance for central heating system

STN 06 0830 - Expanse vessel size

STN 07 7401 - Water in heating system

V_=V.v.1.3 V_c - volume of expanse vessel V - volume of water in heating system v - appropriate volume increase by warming to tm $t_{m}=80^{\circ}C$ is v=0,029

200mm

200mm

If the expanse vessel volume exceeds 7 or 8 litres it is necessary to add next expanse vessel with volume adequate to the difference. To use maximum condensation effect it is necessary to dimensionize heating system to gradient 50/30°C. Fall from the safety 3-bar valve has to be connected to the waste pipe. Heating system has to be equipped with suitable filter. For maximum output of the heat exchanger, its correct function and long lifetime it is necessary to ensure minimum overpressure of the heating system of 0.8bar. Built-in expanse vessel enables boiler connection to closed heating system. Boiler has to be placed to ensure necessary operation conditions, adequately to design of the combustion air inlet and flue gas exhaust.

Boiler is equipped with antifrost system that activates boiler for heating, when the temperature of water at the inlet into the heating system decreases under 6°C. Mechanism is not active, if appliance is disconnected from electricity or gas. If it is necessary, it is possible to use frost-free liquids, additional mixtures or inhibitors, but exclusively in case, that producer of the liquids or additional mixtures guarantees, that his products are suitable for use and do not cause damage of the boiler exchanger or other boiler parts and heating system. It is forbidden to use routine frost-free substances, additional mixtures or inhibitors which are not exclusively intended for use in appliances producing heat and which are not suitable for materials of boiler and distribution system.

Gas connection

Before boiler connecting, the gas connection has to be tested and revised. After boiler connection, all the gas connections have to be tested for tightness, including pipes and armatures in boiler. Gas distribution pipes in hte building must be done in conformity with valid norms STN EN 1775. Dismantable connections of the gas pipes and D.H.W. pipes must not be strained by any other additional powers.

Connection to electricity mains

Boiler is intended for connection to electrical socket of 230V/50Hz placed near boiler by movable inlet cable. Connection to electricity has to be in conformity with norm STN 33 2000-4-46, where the socket has to be equipped with middle safety bar connected to the PE conductor. It is not allowed to use different distributors and extension cords. Electrical voltage has to be 230V/50Hz. Plug installation, room thermostat connection and service of electrical parts must be performed by person with special electrotechnical qualification under the ordinance 50/1978 Zb.

Boiler is equipped with inlet electrical cable without plug. Connection to mains must be done tightly and they must be equipped with bipolar switch with minimum contact distance of 3mm, with integrated fuse of 3A max between boiler and mais. By electrical connections it is necessary to keep polarity (PHASE: brown conductor/ZERO: blue conductor/PROTECTION: yellow-green conductor).

Boiler is equipped with inlet electrical cable without plug. Connection to mains must be done stationary, accessorized with bipole switch, with minimum 3mm distance of contacts, max 3A fuse engaged between boiler and mains. It is important to keep polarity by electrical connections (PHASE:brown conductor / ZERO: blue conductor / PROTECTION:yellow-green conductor). By installation or exchange of electrical cable it is necessary to let grounding wire longer for 2cm than other wires. Inlet electrical cable of device must not be exchanged by user. In case of cable damage, turn device off and call qualified workers of authorized service. For the case of exchange of electrical inlet cable, use only the "HAR H05 VV-F" 3x0,75 mm2 cable with maximum external diameter of 8mm.

Room htermostat a Opentherm (boiler accessory)

ATTENTION: ROOM THERMOSTAT MUST HAVE CLEAN CONTACTS. BY 230V CONNECTION 230 V TO THERMOSTAT TERMINAL IS ELECTRONICS IRREVERSIBLY DAMAGED.

It is necessary to connect room thermostat by copper conductor of $1-1,5mm_2$ diameter. For the Opentherm's contacts it is possible to use copper conductor with diameter of $1-1,5mm_2$.

Conductors of external temperature sensor must not be lead parallely with conductors of the room thermostat and mains connection.

External sensor (boiler accessory)

Connect sensor to appropriate terminals.Use casual 2-wire cable. It is necessary to connect room temperature sensor by copper conductor of 0,75 mm2 diameter.Maximum ohm resistance of conduction is $10k\Omega$, complete length is 30cm. External probe should be rather installed on northern, north-western side or on side, where the living room is generally placed. Probe must never be exposed to morning sun. Generally, it must not be exposed to direct sun radiance. If it is necessary, protect it by cover. Probe must not be installed near windows, door, ventilation openings, chimneys, nor heat sources, which could influence measured values.

Wrong placing of external probe



Access to electrical terminal of the KZT Plus boiler

To access to boiler terminal, it is necessary to remove rear cover and then to make necessary electrical connections, as it is given on scheme on the picture.



Access to electrical terminal of the KST Plus, KT Plus, KT small Plus boilers

To access to boiler terminal, it is necessary to remove rear cover and then to make necessary electrical connections, as it is given on scheme on the picture. After connection of external tank through temperature sensor it is necessary disconnect both resistances on terminal. If tank is connected through tank thermostat, it is only necessary to disconnect resistance1,8k Ω .



Flue gas exhausts

This appliance is a C type, with hermetic chamber and forced exhaust, air inlet and flue gas outlet have to be connected to one of the systems of outlet / suction mentioned further. Appliance is homologized for operation with all chimneys Cxy, that are listed on label with technical data (some configurations are given only as example in this chapter). Despite of that there is a possibility, that some configurations will be literally limiting or they will not conform to prescriptions, norms or national regulations. Check and strictly keep all instructions before installation. Except of that, keep instructions concerning placement of endings on wall ot roof and minimum distances from windows, walls, ventilation openings, etc. This appliance of C type has to be installed by usage of suction pipes and exhaust outlets supplied by producer, in conformity with UNI-CIG 7129/92. In case, that these are not used, any warranty and producer's reliability expires. By installation of flue gas exhausts longer than 1m it is necessary to consider natural material extension of materials by operation. To prevent deformations, let dilatation

space of $2 \div 4$ mm approximately, per 1m of length.

Extension



Connection by coaxial pipes

Examples of connection by coaxial pipes



By coaxial connection, mount one of the following accessory pieces to appliance. It is necessary to keep slight downgrade of horizontal parts of flue gas exhaust to boiler, in order to prevent eventual condensed water leaks out and drops. Accessories by coaxial connection





Maximum length of coaxial outlets

	Coaxial 60/100	Coaxial 80/125
Max. permitted length	5m	10m
Factor of elbow reduction 90°	1m	0,5m
Factor of elbow reduction 45°	0,5m	0,25m

Before installing it is necessary to check, if the maximum permitted length has not been exceeded. Every coaxial arc means length reduction, as it is given in the table. For example, connection 60/100 with elbow of $90^{\circ} + 1m$ of horizontal outlet means equivalent length of 2m. Before installation it is necessary to check, if the max.permitted length was not exceeded (concern, that every coaxial bow causes length reduction as it is given in the table).

Connection by separate tubes

Examples of connection with separate tubes



Before installing, check by simple calculation, if total length does not exceed maximum length:

1. Make final calculation of scheme of double chimneys, including accessories and endings.

2. Check table 4 - losses in meq (equivalent meters) for every item, in dependence from its position in installation.

3. Check, if total amount of losses is lower or equal to the maximum permitted length given in the table.

Maximum length of separate tubes

				Losses in m/	eq		
				Flue gas outlet			
			Air suction	Vertically	Horizontally		
	Pipe	1m O/M	1	1,6 2			
	Elbow	45° O/M	1,2	1,8			
		90° O/M	1,5		2		
Ø 80	Distribution	with control opening	0,3	0	,3		
0 00	air to wall	2					
	Endpiece	flue gas to wall			5		
	Chimney	Air/flue gas 80/80		1	2		

Separate tubes Maximum permitted length 75 meq Examples of connection to chimneys



If you decide to connect boilers **ATTACK Plus** to mutual or separate chimney with natural exhaust, mutual or separate chimney has to be projected exclusively by specialized worker in conformity with valid norms for appliances with hermetic chamber, equipped with fan.

Moreover, it is necessary to keep following characteristics of mutual/separate chimneys:

- dimensionised by calculation method given in valid norms

- proof against flue gas, resistant against smoke and heat, proof against condensed water
- circular or quadrilateral diameter, vertical, without reductions
- with pipe, that takes hot flue gas out, they are adequately remote or isolated from flammable materials with compaction to single applicance on 1 floor
- with connection to single appliance on 1 floor

- with connection to same appliances (or different, but all appliances only with forced flue gas outlet or only with natural flue gas exhaust)

- without mechanical means for suction in main pipes
- with underpressure in all their length, in conditions of stationary operation.

- in their platform they have collection tank for solid material or eventual condense water, equipped with metal door with airtight closing.

Connection to condense water outlet

Boiler is equipped with internal syphon for condence water outlet. By first installation, mount inspection connection (A). Mount flexible pipe of condense outlet (B) to outlet of boiler's syphone by extending it for 3cm approximately and fit it by fixing bolt. Fill syphone for 0,51 of water (2) approximately and connect flexible pipe to outlet device (3).

Outlet of condense water



3. Operation and maintenance

All operations for regulation and adjustment according to type of gas must be done by qualified and trained workers (professional technicians, that respect valid technical norms) - the authorized servicemen. **ATTACK** takes no responsibility for damages on properties, nor injuries of persons that are caused by incorrect manipulation with appliance by unqualified or unauthorized persons.

Regulation

Adjustment according to type of gas

Appliance works on natural gas (G20) or propane (G31). Adjustment of appliance for concrete gas type is performed by producer, as it is given on the serial label. In case that it is necessary to use appliance with another type of gas, than it is intended, it is necessary to ensure appropriate set for transformation. Then it is necessary to make the following steps:

- 1. Remove covering
- 2. Open hermetic chamber
- 3. Hang down fixing clip C and pick gas pipe A out of the fan unit Venturi.
- 4. Exchange nozzle B laid inside the gas pipe for nozzle from boiler transformation set.
- 5. Fix the gas pipe A back by clip and check, if the sealing is tight
- 6. Mount hermetic chamber and covering again.
- 7. Modify parameter related to the gas type:

switch boiler into the stand-by mode, hold DHW buttons pressed (pos. 1 and 2 - pic. 1 and 2) for 10 seconds: flickering, **PI01**" is displayed

by pressing DHW button (pos. 1 - pic.1 and 2), set parameter **00** (by operation for natural gas) or **01** (by operation for propane). Hold DHW button pressed (poz.1 - pic. 1 and 2) for 10 seconds. Boiler gets back to stand-by mode.

8. Check inlet operation pressureat the gas valve inlet.

9. Use combustion analyser, connected to the exhaust outlet from boiler to check, if the CO2 content in flue gas, by max. and min. boiler output, is adequate to the supposed content given in the table with technical data for appropriate gas type.

Gas nozzle exchange



Analysis of combustion

Combustion is analysed in air (2) and flue gas (1) exemption areas as it is given on the picture. For measuring it is necessary to:

1.Open exemption areas of air and flue gas

2.Put probes in

3.Press buttons "+" and "-" by heating sign for 5 seconds to activate the TEST mode

4. Wait 10 minutes until boiler gets into stable operation

5.Measure

Value of CO2 has to be in interval of 8,7 - 9% by natural gas (G20). By propane (G31) it is 9,5-10%. In case, that analysis is done, while boiler is not in stable operation, errors in measuring may occur.

Combustion analysis



Setting of CO2 value by combustion

Setting and check of the CO2 on gas valve can be only by qualified service technician!

Description of gas valve:

- A Inlet pressure
- B Outlet pressure
- C Regulation screw min. output setting
- D Regulation screw max. output setting

By max.output is CO2 set by regulation screw D, by max.output is CO2 set by regulation screw C Co2 test by max. output:

- 1- Put device for combustion analysis into flue gas outlet pipe.
- 2- Start boiler and test mode by pressing "+" and "-" buttons by heating sign for 5 seconds.
- 3- Use "+" button to set heating to max output (100%)
- 4- Check, eventually set CO2 values by screw (1) for the range of 8,7 9,2 % for natural gas (G20) and 10 10,5 % for propane (G31)
- 5- Exit test mode after correct setting.
- CO2 test by min output:
- 1- Put device for combustion analysis into flue gas outlet pipe.
- 2- Start boiler and test mode by pressing "+" and "-" buttons by heating sign for 5 seconds.
- 3- Use "-" button to set heating to min. output (0%)
- 4- Check, eventually set CO2 values by screw (1) for the range of 8,7 9,2 % for natural gas (G20) and 10 10,5 % for propane (G31)
- 5- Set back to 100% and exit test mode after correct setting.









Activation of the TEST mode

Press heating buttons together for 5 seconds to activate the **TEST** mode (see 3 and 4 - pics. 1 and 2). Boiler is started by maximum output of the set heating and actual value, as it is given in the text below.

Signs of heating and DHW flicker on display and temperature of heating. Values of actual heating output and actual value of flame flow (uA x 10) are also displayed.

To exit TEST mode, repeat same process as by activation. TEST mode is everytime automatically stopped after 15 minutes.

Regulation of heating output

To make regulation of heating output, set boiler into the TEST mode. Press buttons of heating (see 3 and 4, pics. 1 and 2) to increase or to decrease output (Minimum = 00 - Maximum = 100). If the RESET button is pressed for 5 seconds, maximum output stays at the level that was actually set.Exit TEST mode.

Operation start-up

Before start and after all installation actions that required disconnection from distribution network or works on safety mechanisms or boiler parts, it is necessary to check the following:

Before boiler start

- open eventual control valves installed between boiler and distribution network.
- check tightness of connections, if there is no gas leakage; be carefull and use soap water solution
- check pressure of expanse vessel overfill
- fill hydraulic devices and ensure absolute deareation of boiler and heating system open deareation
- valve on boiler, eventually deareation valves of distribution system
- check pressure in heating system, cca 1 bar. in cold state
- fill outlet syphone and check correct connection to outlet device for condense water
- check, if there is no water leakage in the heating system, DHW circuit, connections or in the boiler
- check accuracy of connection of electrical device and functionality of grounding
- check if pressure value and gas overflow for heating are adequate to requirements
- check, if there are no flammable liquids or other materials in near surrounding of boiler

Checking during operation

- Turn device on
- Check tightness of gas circuit and heating system
- Check tightness of chimney and air-flue gas exhausts during boiler operation
- Check correct tightness and functionality of syphone and device of outlet of condensed water
- Check correct water circulation between boiler and heating system
- Check correct modulation of gas valve by heating and also by DHW preparation

- Check correct boiler start by several tests of start and stop by room thermostat or by remote time controller

Use combustion analyser, connected to the flue gas outlet from the boiler to check, if the CO2 content in flue gas - by max. and min. boiler output - is adequate to the supposed content given in the table with technical data for appropriate gas sort, eventually adjust it, as it is given in the instructions in chapter about CO2 adjustment on page 18.

-Check, if fuel consumtion, displayed on counter, is appropriate to consumption given in the table with technical data.

- Check correct parameter programming and make eventual adjustments according to your needs (compensation curve, output, temperatures, etc.)

Maintenance

Regular check

To keep long-time functionality and effectivity of device, qualified worker must regularly perfom the following tests:

- Control and safety elements (gas valve, flow sensor, thermostats, etc.) must work correctly

- Circuit of flue gas exhaust must be perfectly tight

- Closed chamber has to be tight
- Pipes and ending air-flue gas must have no barriers, nor leakage

- System for condense water outlet must be functional, without barriers and it cannot leak

- Burner and exchanger must be clean and without sediments. By eventuall cleaning, do not use chemical means, nor steel brushes.

chemical means, nor steel brushes.

- Electrode must be placed correctly, with no sediments
- Gas and water supply connections must be ensured against leakage

- Pressure of water in distribution device in cold state must be approximately 1 bar. If pressure is different, adjust this value.

- Circulation pump must not be blocked
- Expanse vessel must be filled

- Flow and gas pressure must correspond to data given in appropriate tables

Cover, control panel and external parts of boiler can be cleaned by soft wet cloth, eventually soak in water with cleaner. Do not use abrasive cleaners nor dissolvents.

How to open cover of the KZT Plus boiler

To open cover of boiler:

- 1. Dismantle screws A (1)
- 2. Pull cover to open (2)
- 3. Lift up and remove cover (3)





How to open cover of the KST Plus, KT Plus, KT small Plus boilers

To open cover of boiler:

- 1. Dismantle screws (1)
- 2. Pull cover to open (2)
- 3. Lift up and remove cover (3)



Table of error messages

Diagnostics

Boiler is equipped with modern system for autodiagnostics. In case of boiler error, display flickers together with the sign of error and number indicating error code.

There are errors, that cause permanent blockage (marked by "A" letter): to get boiler back to normal operation, press RESET button for 1 second or use RESET on remote time controller (additional), if it is installed; if boiler does not come to operation, it is necessary to remove the fault. Errors (marked by "F" letter) cause often blockages, that are automatically removed, immediately after the value gets back into the interval of normal boiler operation.

Code	Error	Possible cause	Solution		
		No gas is supplied	Check, if gas inlet into boiler is balanced and if pipes are deareated		
A01	Burner did not ignit	Error of ignition and ionisation electrode	Check cable connection of electrodes, their correct placing and if there are no sediments on them		
	-	Damaged gas valve	Check and change gas valve		
		Insufficient gas pressure in network	Check gas pressure in distribution network		
		Blocked syphon	Check and clean syphon, if necessary		
		Error of electrode	Check cable connection of ionisation electrode		
A02	Signal of flame presence by extinguished burner	Error of control electronics	Check electronics		
		Damaged sensor of heating	Check correct placing and operation of central heating sensor		
A03	Boiler overheating	Water in device does not circulate	Check circuiting pump		
		Areated heating system	Deareate heating system		
404	Intervention of fuse of flue	Error F07, that occured 3-times	0		
A04	gas and smoke exhaust	in last 24 hours	See error FU7		
A05	Action of ventilator fuse protection	Error F15 that remained for 1 hour period	See error F15		
		Error of ionisation electrode	Check position of ionisation electrode or exchange it		
	No flame in start-up phase	Unstable pressure	Check burner		
A06	(6-times within 4 min.)	Error	Check setting of gas valve by min. output		
	. ,	Flue gas outlet clogged	Remove barries from piping of flue gas outlet		
		Syphon clogged	Check and eventually clean the syphon		
		Damaged sensor			
F10	Sensor failure at the entry	Cabling under shortage	Check connection of cables or change sensor		
	Into distribution device 1	Aborted cables			
		Damaged sensor			
F11	Failure of sensor of return flow	Cabling under shortage	Check connection of cables or change sensor		
		Aborted cables			
	Sonsor failure at the entry	Damaged sensor			
F14	into distribution dovice 2	Cabling under shortage C	Check connection of cables or change sensor		
		Aborted cables			
F34	Supply voltage lower than 170V	Problems with electricity mains	Check electricity mains		
F35	Incorrect frequency in electrical mains	Problems with electricity mains	Check electricity mains		
F 07	Incorrect water pressure in	Too low pressure	Refill system with water		
F37	device	Damaged sensor/ switch of pressure	Change the RZT sensor or RT,RST pressure sensor		
F39	External probe error	Damaged sensor or shortage	Change sensor or check connection of cables		
E40	Incorrect water pressure in	Too high water prossure	Check safety valve		
Г40	device	Too high water pressure	Check pressure in expanse vessel		
A41	Placing of sensors	Sensor disconnected from pipe	Check correct placing of sensor		
F42	Error of heating sensor	Damaged sensor	Change sensor		
		Water in device does not circulate	Check circuit pump		
F43	Safety action of exchanger	Areated distribution device	Deareate heating system		
F47	Error of pressure sensor	Aborted cables	Check connection of cables		
F50	Error of modulation reel	Aborted cables	Check connection of cables		

4. Characteristics and technical data

Dimensions and connections of the KZT Plus boiler

Dimensions and connections

- **1** = Inlet into heating system (c.h. flow connection)
- **2** = Outlet of supply water
- 3 = Gas inlet
- 4 = Inlet of supply water
- 5 =Return flow from heating system (c.h.return flow)



Dimensions and connections of the KT Plus boiler

Dimensions and connections

- **1** = Inlet into heating system (c.h. flow connection)
- 3 = Gas inlet
- **5** = Return flow from heating system (c.h.return flow)
- **6** = Safety valve release







318

460



198, 120

95

Dimensions and connections of the KST Plus boiler

Dimensions and connections

- **1** = Inlet into heating system (c.h. flow connection)
- **2** = Supply water outlet
- $\mathbf{3} = \mathbf{Gas}$ inlet
- 4 = Supply water inlet
- 5 =Return flow from heating system (c.h.return flow)
- **6** = Safety valve release







132

65

68

120

Dimensions and connections of the KT small Plus boiler

Dimensions and connections

- 1 = Inlet into heating system (c.h. flow connection)
- 3 = Gas inlet
- **5** = Return flow from heating system (c.h.return flow)
- 6 =Safety valve release





Main parts of the KZT Plus boiler



- 5 Hermetic chamber
- 7 Gas inlet
- 8 Supply water outlet
- 9 Supply water inlet
- 10 Inlet into heating system (c.h.flow connection)
- 11 Return flow from heating system (c.h.return connection)
- 14 Safety valve
- 16 Ventilator
- 19 Combustion chamber
- 22 Ceramic burner
- 29 Collector on flue gas outlet
- 32 Circuit pump of heating
- 36 Automatic deareation valve
- 37 Filter on cold water inlet
- 40 Expanse vessel of supply water
- 44 Gas valve
- 56 Expanse vessel
- 74 Tap to fill distribution device
- 82 Ionisation electrode
- 95 Three-way valve

- 130 Pump of supply water
- 145 Manometer
- 161 Heat exchanger
- 186 Sensor of heating water return connection
- 188 Ignition electrode
- 191 Sensor of flue gas temperature
- 193 Syphon
- 194 Exchanger of supply water
- 195 Stainless steel tank for supply water 25lit.
- 196 Condensate collector
- 243 Sensor of supply water temperature
- 246 Pressure sensor
- 250 Filter on inlet into heating system
- 278 Double sensor (Safety + Heating)

Main parts of the KST Plus boiler





- 5 Hermetic chamber
- 7 Gas inlet
- 8 Supply water outlet
- 9 Supply water inlet
- 10 Inlet into heating system (c.h. flow connection)
- 11 Return flow from heating system (c.h. return connection)
- 14 Safety valve
- 16 Ventilator
- 19 Combustion chamber
- 22 Cearmic burner
- 29 Collector at flu gas outlet
- 32 Circuit pump of heating
- 36 Automatic deareation valve
- 37 Filter at cold water inlet
- 39 Regulator of supply water flow
- **42** Temperature sensor of supply water
- 44 Gas valve
- 56 Expanse vessel

- 74 Tap to fill distribution device
- 82 Ionisation electrode
- 95 Three-way valve
- 114 Sensor of water sensor
- 136 Flow sensor
- 161 Heat exchanger
- 186 Sensor of heating water return connection
- 188 Ignition electrode
- 191 Sensor of flue gas temperature
- 193 Syphon
- 194 Heat exchanger of supply water
- 196 Collector of condensate
- 201 Mixing Venturi pipe
- 250 Filter at inlet into heating system
- 278 Double sensor (Safety + Heating)

Main parts of KT Plus, KT small Plus boilers



5 Hermetic chamber

7 Gas inlet

- 10 Inlet into heating system (c.h.flow connection)
- 11 Return flow from heating system (c.h.return connection)
- 14 Safety valve
- 16 Ventilator
- 19 Combustion chamber
- 22 Main burner
- 29 Collector at flue gas outlet
- 32 Circuit pump of heating
- **36** Automatic deareation valve
- 44 Gas valve
- 56 Expanse vessel
- 74 Tap to fill distribution device

- 82 Ionisation electrode
- 95 Three-way valve
- 114 Sensor of water pressure
- 161 Heat exchanger
- 186 Sensor of return connection of heating water
- 188 Ignition electrode
- 191 Sensor of flue gas temperature
- 193 Syphon
- 196 Collector of condensate
- 201 Mixing venturi pipe
- 209 Outlet into water tank
- 210 Return flow from water tank
- 250 Filterat inlet into heating system
- 278 Double sensor (Safety + Heating)

Hydraulic circuit of the KZT Plus boiler



- 7 Gas inlet
- 8 Outlet of domestic hot water
- 9 Inlet of domestic hot water
- 10 Inlet into heating system (c.h.flow connection)
- 11 Return flow from heating system (c.h. return connection)
- 14 Safety valve
- 16 Ventilator
- 32 Circuit pump of heating
- 36 Automatic deareator
- 40 Expanse vessel of supply water
- 44 Gas valve
- 56 Expanse vessel
- 74 Tap to fill distribution device
- 95 Three-way valve
- 97 Magnesium anode
- 130 Pump of supply water

- 154 Pipe for condensed water outlet
- 161 Heat exchanger
- 186 Sensor of heating water return connection
- 191 Sensor of flue gas temperature
- 193 Syphon
- 194 Exchanger of supply water
- 195 Stainless tank of supply water 25lit.
- 196 Collector of condensate
- 241 Automatic by-pass
- 243 Sensor of supply water temperature
- 246 Pressure sensor
- 250 Filter at inlet into heating system
- 278 Double sensor (Safety + Heating)



7 Gas inlet

- 8 Domestic hot water outlet
- 9 Domestic hot water inlet
- **10** Inlet into heating system (c.h.flow connection)
- 11 Return flow from heating system (c.h. return connection)
- 14 Safety valve
- 16 Ventilator
- 32 Circuit pump of heating
- 36 Automatic deareator
- 37 Filter at cold water inlet
- 42 Temperature sensor of supply water
- 44 Gas valve
- 56 Expanse vessel
- 74 Tap to fill distribution device

- 95 Three-way valve
- 114 Water pressure sensor
- 136 Sensor of supply water flow
- 154 Outlet pipe of condensed water
- 161 Heat exchanger
- 186 Sensor of heating water return connection
- 193 Syphon
- 194 Heat exchanger of supply water
- 196 Condensate collector
- 241 Automatic by-pass
- 250 Filter at inlet into heating system
- 278 Double sensor (Safety + Heating)

Hydraulic circuit of the KT Plus, KT small Plus boilers



- 7 Gas inlet
- **10** Inlet into heating system (c.h.flow connection)
- 11 Return flow from heating system (c.h. return connection)
- 14 Safety valve
- 16 Ventilator
- 32 Circuit pump of heating
- 36 Automatic deareator
- 44 Gas valve
- 56 Expanse vessel
- 74 Tap to fill distribution device
- 95 Three-way valve

- 114 Water pressure sensor
- 154 Condensed water outlet
- 161 Heat exchanger
- 186 Sensor of heating water return connection
- 193 Syphon
- 196 Collector of condensate
- 209 Inlet into water tank
- $\mathbf{210}$ Return flow from water tank
- 241 Automatic by-pass
- 250 Filter at inlet into heating system
- 278 Double sensor (Safety + Heating)

Technical data <u>KZT Plus, KST Plus, KT Plus, KT small Plus</u>

Data	Unit	Value				
		KZT Plus	KST Plus	KT Plus	KTsmall Plus	
Max. thermal power of central heating	kW	25,2	25,2	25,2	18	
Min. thermal power of central heating	kW	5,3	5,3	5,3	3	
Max. thermal output of central heating (80/60°C)	kW	24,6	24,6	24,6	17,7	
Min. thermal output of central heating (80/60°C)	kW	5,2	5,2	5,2	2,9	
Max. thermal output of central heating (50/30°C)	kW	26,6	26,6	26,6	19	
Min. thermal output of central heating (50/30°C)	kW	5,7	5,7	5,7	3,2	
Max. thermal power of DHW	kW	27	27			
Min. thermal power of DHW	kW	5,3	5,3			
Max. thermal output of DHW	kW	26,5	26,5			
Min. thermal output of DHW	kW	5,2	5,2			
Pressure of gas connection G20	mbar		-	20	,	
Max. gas flow G20	m3/h	2,86	2,86	2,86	1,9	
Min. gas flow G20	m3/h	0,56	0,56	0,56	0,32	
Pressure of gas connection G31	mbar			37		
Max. gas flow G31	kg/h	2,11	2,11	2,11	1,41	
Min. gas flow G31	kg/h	0,41	0,41	0,41	0,23	
		•				
Max. substantive flue gas overflow	kg/h		41,2		30,3	
Min. substantive flue gas overflow	kg/h	9,4			5,3	
Max. flue gas temperature	°C		62		63	
Min. flue gas temperature	°C			60		
Class of efficiency by directive 92/42EHS		****				
Emissions class Nox				5		
Max. operation pressure by heating	bar			3		
Min. operation pressure by heating	bar	0,8				
Max. temperature into heating	°C			95		
Water volume in boiler in central heating	litre	1,5 1,5 1,5		1		
Volume of expanse vessel of central heating	litre	8	8	8	7	
Pressure of central heating expanse vessel overflow	bar			1		
Max. pressure of central heating	bar	9	9			
Min. pressure of central heating	bar	0,25	0,25			
Water volume in boiler in DHW	litre	25	0,3			
DHW flow t 25°C	l/min		15,2			
DHW flow t 30°C	l/min		12,7			
DHW flow t 30°C	l/10min	160				
DHW flow t 30°C	l/hod	790				
Volume of DHW expanse vessel	litre	2				
Pressure of DHW expanse vessel overflow	bar	1				
Protection of electrical parts	IP			X5D		
Voltage of electrical mains	V/Hz	230/50Hz				
Electrical input	W	180	120	120	115	
Electrical input by DHW production	W	180	120			
Weight of empty boiler	kg	53	37	36	31	
Sort of appliance		C 1	3-C23-C33-C	43-C53-C63	-C83-B22	

Electrical scheme of the KZT Plus boiler





Electrical scheme of the KST Plus boiler



- 32 Circuit pump of heating
- 42 Sensor of supply water temperature
- 44 Gas valve
- 72 Room thermostat
- 82 Ionisation electrode
- 95 Three-way valve
- 114 Switch of water pressure
- 136 Flow sensor
- 138 External sensor
- 139 Remote time control
- 186 Sensor of return flow of heating water
- 188 Ignition electrode
- 191 Sensor of flue gas temperature
- 278 Double sensor (Heating + Safety)

A Contact ON/OFF of flow sensor



Electrical scheme of the KT Plus, KTsmall Plus boilers

6 Ventilator

- 32 Circuit pump of heating
- 42 Sensor of supply water temperature
- 44 Gas valve
- 72 Room thermostat
- 82 Ionisation electrode
- 95 Three-way valve
- 114 Switch of water pressure
- 138 External sensor
- 139 Remote time controller
- 186 Sensor of return flow of heating wat
- 188 Ignition electrode
- 191 Flue gas temperature sensor
- 278 Double sensor
 - (Heating + Safety)



Diagram of pressure losses by filling and height differences of pumps of boilers <u>KZT</u> <u>Plus, KST Plus, KT Plus, KTsmall Plus</u>

A Losses of boiler infill

1-2-3 Speed of circuit pump



Accessories of flue gas exhaust

Accessories of coaxial flue gas exhaust with diameter of Æ 60/100mm

Code	Name
PR37	extension 1m D60/100 paint
Pr38	extension 0,5m D60/100 paint
PR39	chimney 60/100 paint
PR40	elbow 90° D60/100 paint
PR41	elbow 45° D60/100 paint
PR42	elbow with flange + service opening D60/100
PR43	vertical flange + service opening D60/100
DD 44	$a_{\rm m} d_{\rm m} i_{\rm m} = D(0/100 \text{ modes})$

PR44 endpipe D60/100 paint

Accessories of double flue gas exhaust and air suction with diameter of Æ 80 mm

Code	Name
PR45	pipe of exhaust and suction 1m D80
Pr46	extension 1 m D80
Pr47	extension 0,5 m D80
PR48	elbow 90° D80 O/M
PR49	elbow 45° D80 O/M
Pr50	chimney D80
PR51	vertical distributor D60/100 - D80/80

Temperature sensors of heating, hot water heating and flue gas



Sensor of central heating inlet



Flue gas sensor



Double sensor

Table of temperature dependence of resistivity

Temperature (°C)	100	90	80	70	60	50	40	30	25	15	5
Resistivity (K Ohm)	0,68	0,92	1,25	1,7	2,5	3,6	5,3	8	10	15,6	25,3

- Attack" -----

RECORD ON PUTTING THE BOILER TO OPERATION

Production number
Date of putting to operation
Service organization:

.Stamp, signature

.....

Data on the customer (llegible) Name and surname:
Street: Post code, town:.
Tel. No

Obligatory service examination after the 1st year of operation

Date :Stamp, signature of service organization :

Obligatory service examination after the 2nd year of operation

Date :Stamp, signature of service organization :

Obligatory service examination after the 3 rd year of operation

Date :Stamp, signature of service organization :

Producer: Attack

ATTACK, s.r.o. Tel: Dielenská Kružná 5020 Fax: 038 61 Vrútky E-ma SLOVAKIA Web:

 Tel:
 00421 43 4003 103

 Fax:
 00421 43 4003 116

 E-mail:
 export@attack.sk

 Web:
 www.attack.sk





Vipoloca ATACK £1.0. 8 vjehračkuje prévo technických zmieni výpoblov kez prechkátzajíceho upoznomela. ATACK £1.0. produce neserves tře nějí to kompe technical pameteria and dimensico té obies valkod previous saming Der i kentelise ATACK £1.0. telehá štoh das Recht der technichen Verklerungen an Podukter obre eine vojet Warmus, Janovaman, ATAC K2.1.0. testen je do das model statistické se stratistické se stratisti se stratistické se stratistické se stratisti