

# Instruction manual



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# WE HOPE YOU WILL BE SATISFIED WITH OUR PRODUCT, AND WE RECOMMEND TO COMPLY WITH THESE MAIN REGULATIONS NECESSARY FOR LONG SERVICE LIFE AND CORRECT FUNCTION OF THE BOILER

1. Assembly, firing-up test and operator's training **must be carried out by an installation company trained by the manufacturer**; this company also fills in a boiler installation report (p. 37).
2. At the **gasification process** the **wood tars and condensates (acids)** are produced in the fuel reservoir therefore the thermoregulation valve must be installed behind the boiler in order to keep the **minimum 65 °C temperature of the water returning to the boiler**.  
The **operating temperature** of water in the boiler must be between **80 and 90 °C**.
3. Every circulating pump in the system must be regulated by an individual thermostat in order to keep the **specified minimum temperature of water returning to the boiler**.
4. The boiler **must not be permanently** operated in an output **lower than 50 %**.
5. The boiler operation at the rated output is ecological.
6. When operating the boiler in a lower output mode (summer operation or heating up domestic hot water (DHW)), it is necessary to fire-up daily.
7. Therefore the boilers should be installed with the **accumulation tanks and Laddomat 21/22 which guarantees 20 - 30 % fuel savings and a longer service life of boiler and chimney with a more comfortable operation**.
8. If you cannot install the boiler into an accumulation system, then we recommend installing it at least with **one buffer tank**; the volume of which should be 25 l per 1 kW of the boiler output.
9. Use only dry fuel with **12 - 20 % moisture** – with a higher moisture the boiler output boiler decreases and the fuel consumption increases.



**CAUTION - If the boiler is connected with Laddomat 21/22 or with thermoregulation valve TV 60 °C and the accumulation tanks (see the enclosed diagrams), the guarantee for the boiler body is increased from 24 to 36 months. The guarantee for other parts does not change. In case these principles are not adhered to the service life of the boiler body and ceramic fittings can be substantially reduced due to the low-temperature corrosion. The boiler body can corrode within two years.**



**CAUTION - INSTALLER SHOULD ALWAYS COMPLY WITH LOCAL PLANNING AND BUILDING REQUIREMENTS.**

## 1. Intended use

The environmentally friendly boilers ATMOS are designed for heating family houses, cottages, holiday houses and other similar buildings. Boilers are suitable for buildings with heat loss ranging between 19, 25, 29.8, 40 and 49 kW, depending on type. The boilers are constructed mainly for burning logs. Any type of dry wood is suitable for heating, especially wooden logs up to a maximum length 330 - 530 mm as per the boiler type. If you use logs of a larger diameter the nominal output is then decreased and the burning period prolonged. The boiler is not intended for burning saw dust or small-particle wood waste. These can be burnt in small quantities only, together with log-firewood. MAX. 10 %. Due to their huge feeding hoppers, the boilers save the user a lot of laborious wood preparation and splitting operations. They save both - the physical effort and also the time dedicated to these operations.

## 2. Technical specifications

The boilers are designed for burning wood based on generator gasification principle utilising an exhaust fan, which suck out the flue gas from the boiler.

The boiler body is manufactured as a welded structure from 3 - 6 mm thick steel sheets. Consist of the fuel hopper which at the lower end of this hopper comprises a heatproof shaped piece (nozzle) with longitudinal opening (slot) for passing of combustion products and gases and heat proof shaped piece at the sides. The burn out (bottom) chamber is equipped with ceramic shaped pieces (spherical space). There is a vertical flue gas duct at the rear of the boiler body which is in its upper section equipped with an ignition valve. The upper part of the flue gas duct is equipped with gas outlet pipe for connecting to chimney. The front wall is in the upper part equipped with stoking door and with ashtray door in the lower part. In the front section of the upper hood there is an ignition valve pull rod. The boilers' body is externally heat insulated with mineral wool placed beneath the sheet metal covers of the boilers' external housing.

A control panel for electromechanical regulation is situated in the upper part of the boiler. In the rear section of the boilers, there is a primary and secondary air feeding duct fitted with a control valve, which is operated by FR 124 draught regulator. Primary and secondary air is preheated to high temperature.

### Boiler construction has following advantages

The combustion process proceeds to the function generator gasification at high temperatures. The boilers called GD are provide with the ceramic fire chamber and with the primary air inlets on the sides.

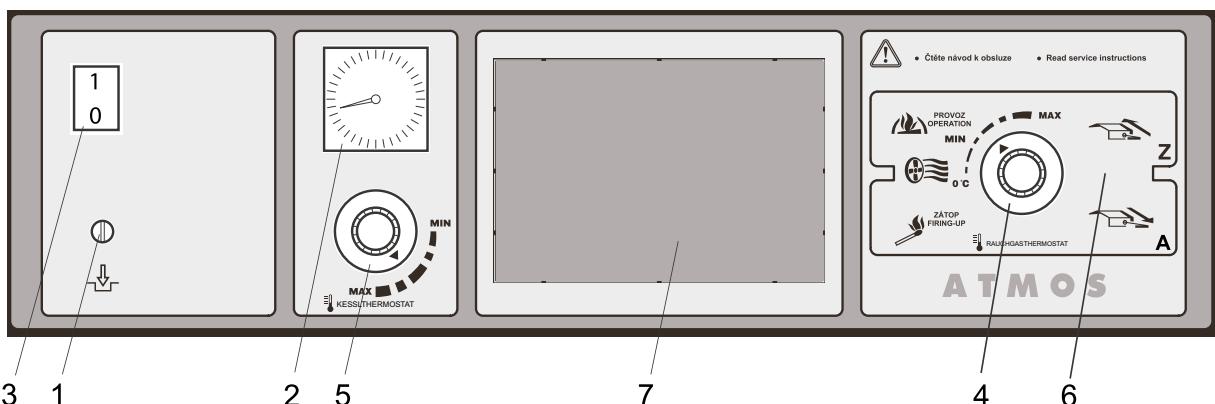
### EXHAUST FAN = COMFORT OPERATION

The boilers pre-heat the primary and secondary air to a high temperature which results in warm and stable flame of stable burning quality.

Large fuel hopper allows burning of the log pieces with the maximum length 330 - 530 mm, depending on the boiler type. Large pieces of waste wood can also be burned. All boilers are equipped with cooling loop for overheating protection.

## Control panel for boilers with ventilator

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### Controls elements:

- 1. Safety irreversible thermostat
- 2. Thermometer
- 3. Main switch
- 4. Flue gas thermostat
- 5. Control thermostat (boiler)
- 6. Ignition valve pulling rod
- 7. Area for electronic regulation of the heating system (92x138 mm)

### Control elements function:

1. **Safety irreversible thermostat** – serves as boiler protection against overheating in case of control thermostat failure or as an indication of exceeding the emergency temperature (100 °C). If such exceeding occurs, it is then necessary to depress the thermostat.
2. **Thermometer** – monitors the temperature of water exiting the boiler.
3. **Main switch** – allows for completely shutting down boiler if necessary.
4. **Flue gas thermostat** – is used to switch off the ventilator when the fuel has burnt out.



**CAUTION** – when firing up (igniting), set the flue gas thermostat to (“0 °C“- firing-up). After flaring up, set the flue gas thermostat to „operation“. It is necessary to detect the optimal operating position. Should the flue gas temperature fall below the preset value, the thermostat switches the extraction ventilator off. If you want the ventilator to re-start, set a lower temperature on the flue gas thermostat (set to “0 °C“ - firing-up).

5. **Control thermostat (boiler)** – controls the boiler operation depending on the temperature of water exiting the boiler (80 - 90 °C).
6. **Ignition valve pulling rod** – serves for opening the ignition valve during heating or inserting fuel.
7. Area for electronic regulation of the heating system can be used to house any type of regulation system that fits into an aperture of (92x138 mm). The electric harness is prefabricated and ready to be used for the regulation's power supply.

### 3. Technical data

Boiler type	ATMOS					DC50GD
	DC18GD	DC25GD	DC30GD	DC40GD		
Boiler output	kW	19	25	29,8	40	49
Heat-up area	m <sup>2</sup>	2,5	3,1	3,1	3,8	4,1
Fuel chamber volume	dm <sup>3</sup>	85	125	125	170	170
Specified chimney draught	mbar	0,16	0,18	0,20	0,22	0,24
Max. water overpressure	kPa	250	250	250	250	250
Boiler weight	kg	376	469	466	548	565
Flue gas duct neck diameter	mm	150/152	150/152	150/152	150/152	150/152
Boiler height	mm	1281	1281	1281	1435	1435
Boiler width	mm	680	680	680	680	680
Boiler depth	mm	830	1030	1030	1120	1120
Electric parts ingress protection	IP	20	20	20	20	20
Electric input	W	50	50	50	50	50
Boiler efficiency	%	90,3	90,5	90,8	90,5	92,0
Sound level	dB	65	65	65	65	65
Specified fuel	Dry wood with heating capacity 15 - 17 MJ.kg <sup>-1</sup> , water content at least 12 % - max. 20 %, average 80 - 150 mm					
Average fuel consumption	kg.h <sup>-1</sup>	3,9	6	7,1	10	13
Per heating season	1 kW = 1 stacked cubic meter					
Maximum wood length	mm	330	530	530	530	530
Boiler water volume	l	73	105	105	112	128
Temperature of water returning to boiler	Specified minimum temperature of water returning to boiler is 65 °C					
Connecting voltage	V/Hz	230/50				
Flue gas temperature at nominal output	°C	145	132	155	175	183
Flue gas combustion products flow weight at nominal output	kg/s	0,014	0,017	0,017	0,021	0,025
Hydraulic pressure drop	mbar	0,22	0,22	0,22	0,23	0,24
Boiler class		5	5	5	5	5
Burning time at nominal output		2	2	2	2	2
Regulation temperature settings	°C	from 75 to 95				
Feeding inlet dimensions	mm	(Ø) 450 x 260				
Cold water temperature pressure for safety heat exchanger	°C/bar	20 > / 2				



**NOTE** - logs with a larger diameter must be halved or quartered (depending on the operational and output requirement of the boiler). Soft and hard wood can be burned. The wood must be dry! - The output of the boiler depends on the wood moisture. The output and function of the boiler is guaranteed with wood moisture 12 - 20 %.

## Boiler drawings key

1. Boiler body
2. Stocking door (upper)
3. Ash-pan door (lower)
4. Exhaust fan
5. Heatproof shaped piece - nozzle
6. Control panel
7. Safety thermostat
8. Regulating flap
9. Heat proof shaped piece – for type GD  
- combustion area side)
10. Heat proof shaped piece – for type GD  
- spherical space
11. Sealing – nozzle - 12 x 12 (14 x 14)
12. Heatproof shaped piece – half moon
13. Ignition valve
14. Heat proof shaped piece – for type GD  
- rear face of spherical space
15. Cleaning lid
17. Ignition valve pulling rod

18. Thermometer
19. Intake duct - air duct
20. Main switch
22. Draught regulator - Honeywell FR 124
23. Cooling loop protecting against overheating
24. Ventilator control thermostat (boiler)
25. Door filling - Sibral
26. Door sealing – cord 18 x 18
27. Flue gas thermostat
30. Capacitor
33. Flue gas brake (Turbulator)

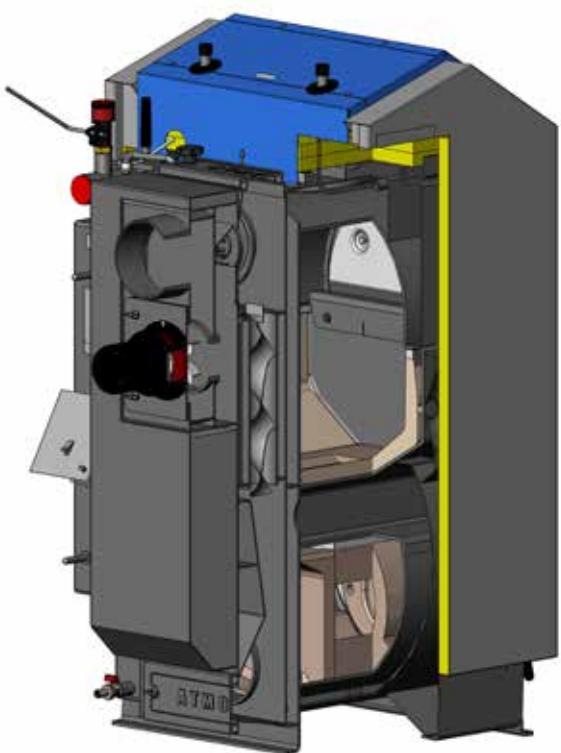
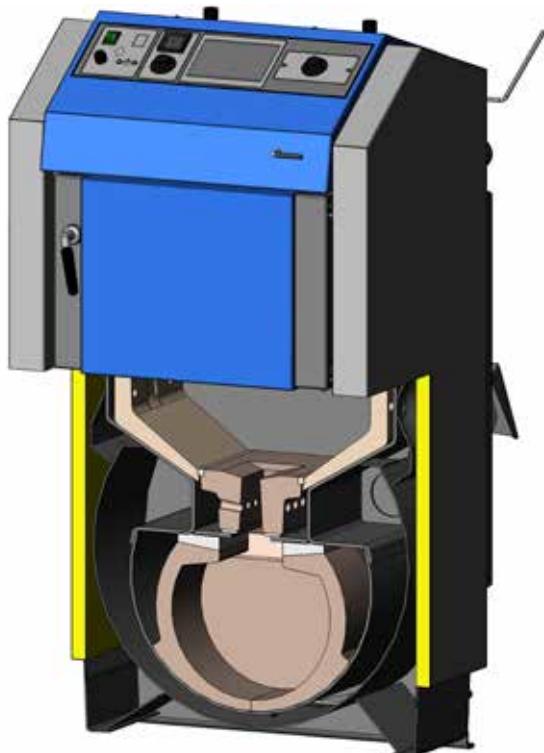
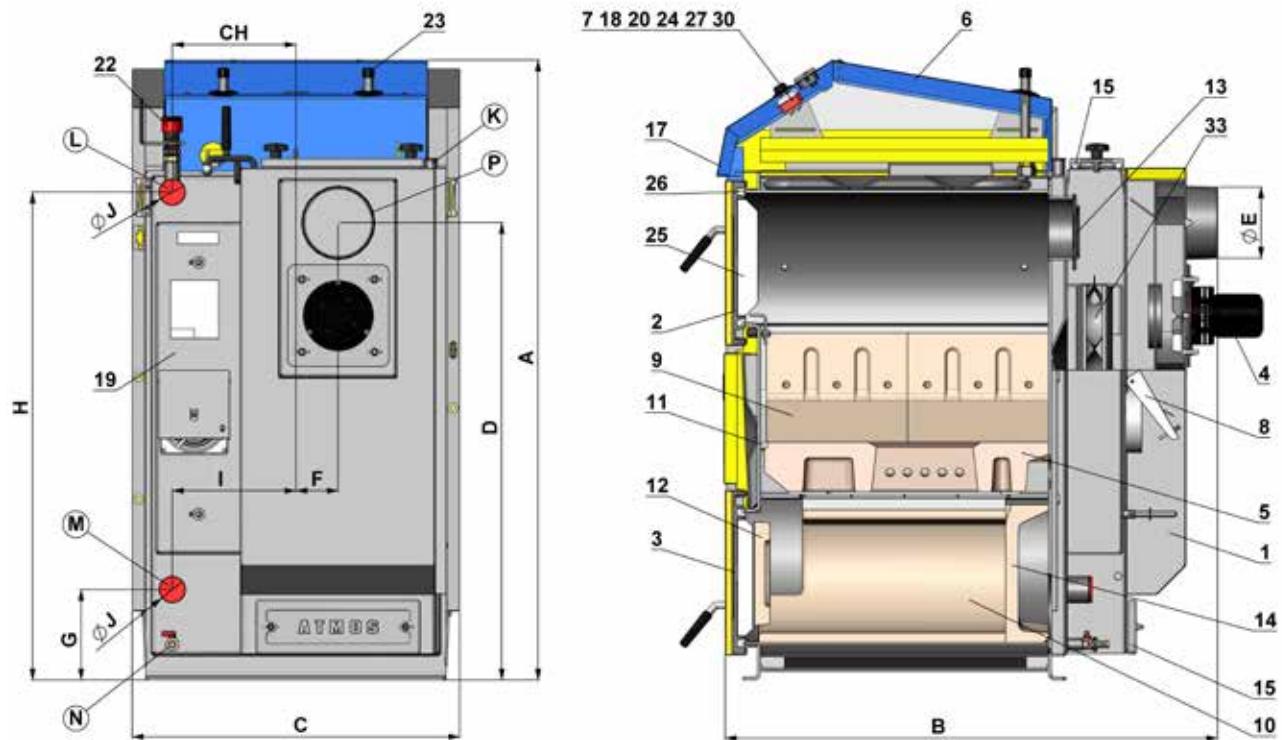
K - flue gas duct neck  
 L - water outlet from  
 M - boiler – water inlet to  
 N - boiler – filling valve  
 P - pipe sleeve – sleeve for cooling loop control  
 valve sensor (TS 131, STS 20)

## Technical data

ATMOS type	DC18GD	DC25GD	DC30GD	DC40GD	DC50GD
<b>A</b>	1281	1281	1281	1435	1435
<b>B</b>	820	1020	1020	1120	1120
<b>C</b>	680	680	680	680	680
<b>D</b>	945	945	945	1095	1095
<b>E</b>	150/152	150/152	150/152	150/152	150/152
<b>F</b>	87	87	87	82	78
<b>G</b>	185	185	185	185	185
<b>H</b>	1008	1008	1008	1152	1152
<b>CH</b>	256	256	256	256	256
<b>I</b>	256	256	256	256	256
<b>J</b>	6/4“	6/4“	6/4“	2“	2“

## Drawings of boilers

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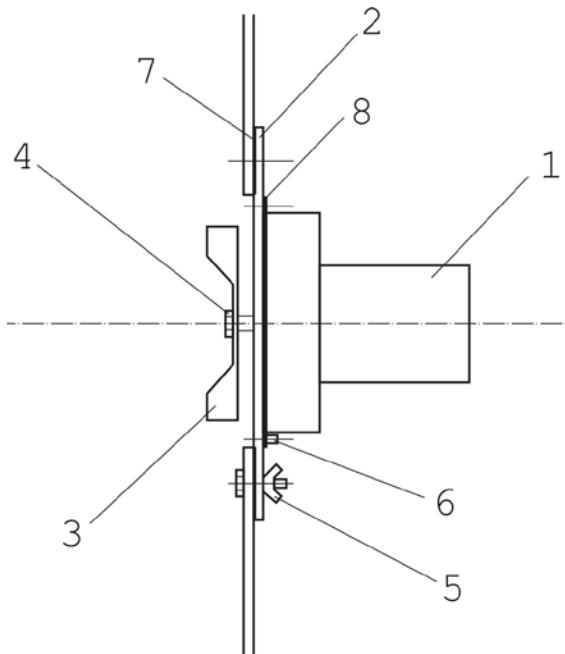


## Exhaust fan schematics



**CAUTION** – The exhaust fan is provided disassembled. Place it on the smoke duct, fasten properly and test its smooth operation.

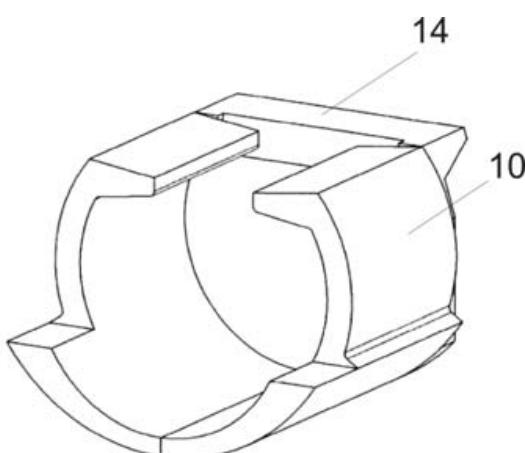
- 1 - Motor
- 2 - Plate
- 3 - Rotating wheel (stainless steel)
- 4 - Nut with left-handed thread and washer
- 5 - Wing nut
- 6 - Screw
- 7 - Large gasket (2 pcs)
- 8 - Small gasket



## 4. Type and seating of shaped pieces into combustion area

For type:

DC 18 GD  
DC 25 GD  
DC 30 GD  
DC 40 GD  
DC 50 GD



The spherical space must be assembled in a way that ensures that the front section of the piece /10/ is 3 cm away from the front edge of the boiler frame.

- 10. Heat proof shaped piece  
- spherical space (R + L)
- 14. Heat proof shaped piece - rear face



**CAUTION** – do not turn the rear face /14/ in case of possible manipulation.

## 5. Boiler accessories

Steel brush with accessories	1 pc
Poker	1 pc
Filling-in valve	1 pc
Operating and maintenance instructions manual	1 pc
Draught regulator - HONEYWELL FR 124	1 pc
Ashtray	1 pc
Device for pulling the flue gas brake (turbulator) from the flue duct	1 pc

## 6. Fuel

Specified fuel is dry chopped log fire wood, Ø 80 - 150 mm, at least two years old, moisture 12 % to 20 %, calorific power 15 – 17 MJ.kg<sup>-1</sup> and log length 330 - 530 mm as per boiler type. Fuel dimensions are stated in section 3 „Technical Data“. It is also possible to burn large pieces of wood waste in combination (max. 10 %) with crude logs.

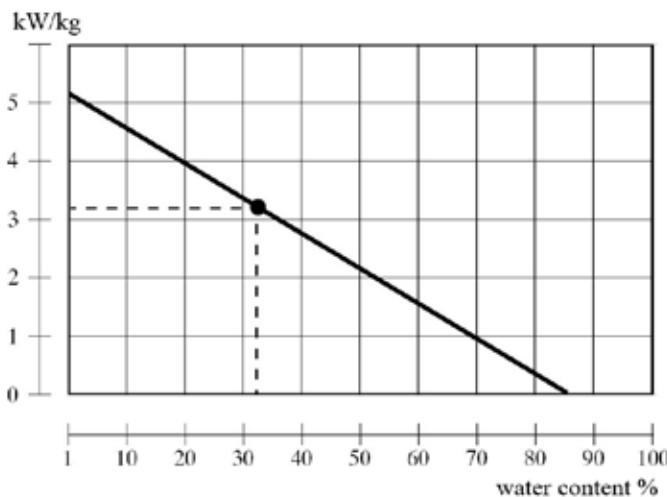
### Basic wood burning data

You can ensure maximum output and a long service life if you burn wood which has been left for at least 2 years to dry. The following graph illustrates the relationship of moisture content to heating capacity of the fuel. The energy content declines dramatically with increased water contents.

Example:

Wood with 20 % moisture contents has thermal power of 4 kWh /1 kg of wood  
 Wood with 60 % moisture contents has thermal power of 1.5 kWh /1 kg of wood

- Example – spruce wood which has been stored for 1 year under shelter – see graph



The boilers maximum output with wet fuel illustrated in the graph

	kW
DC 18 GD	- 13
DC 25 GD	- 19
DC 30 GD	- 22
DC 40 GD	- 31
DC 50 GD	- 39

## Fuel heating capacity

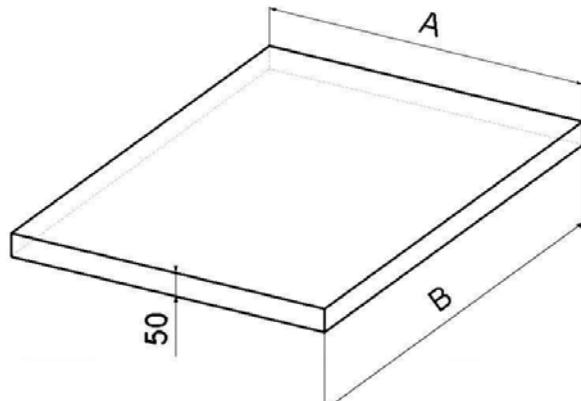
Wood - type	Heating capacity per 1 kg		
	kcal	kJoule	kWh
spruce	3900	16250	4,5
pine	3800	15800	4,4
birch	3750	15500	4,3
oak	3600	15100	4,2
beech	3450	14400	4,0



Raw wood does not burn easily, produces a lot of smoke and substantially decreases the service life of your boiler and chimney. Boiler output drops as low as 50 % and fuel consumption doubles.

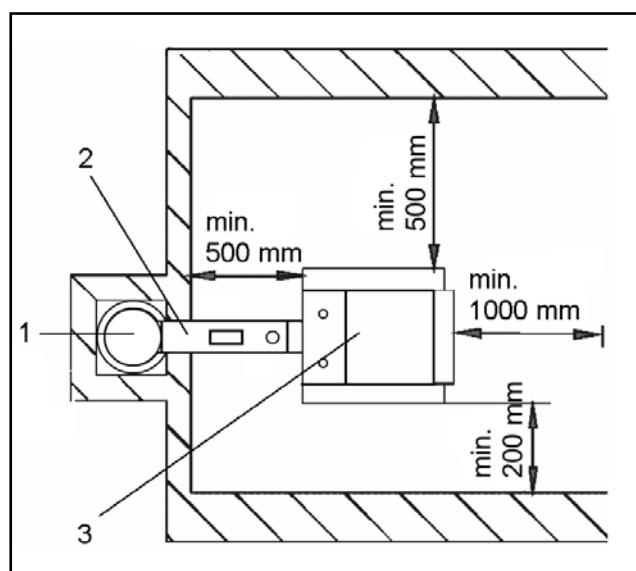
## 7. Boiler bases

Boiler type (mm)	A	B
DC18GD	700	600
DC25GD, DC30GD, DC40GD, DC50GD	700	800



We recommend providing a concrete (metal) base under the boiler.

## 8. Environment type and boiler placement in a boiler room



Boilers may be used in a “basic environment” - AA5/AB5 as specified in Czech standard ČSN3320001. Boilers must be placed in a boiler room with sufficient air access necessary for combustion. Placing boilers in living areas (including halls) is not permitted. The combustion air inlet aperture in the boiler room must be of minimum 250 cm<sup>2</sup> for boilers of 15 - 75 kW outputs.

- 1 - Chimney
- 2 - Flue duct
- 3 - Boiler

## 9. Chimney

**Connecting the appliance to the chimney vent stack must always be carried out with the permission of the appropriate chimney authority.** The vent stack must always be capable of providing sufficient draught and it must discharge the flue gas into the open atmosphere in a reliable manner for all possible operating conditions. The dimensions of the individual vent stack must be correct to ensure good functionality of the boiler; **because the draught influences combustion, performance and the service life of the boiler.** The chimney draught is directly dependent on its cross section, height and the inner wall ruggedness. It is not permitted to connect another appliance into a chimney into which a boiler is connected. **The chimney diameter must not be smaller than the boiler outlet (min. 150 mm).** The chimney draught must comply with the specified values (see technical data, page 8). The chimney must not be excessively high, otherwise the boiler effectiveness is decreased and the combustion is affected (the flame "breaks"). In case of excessive draught, install a throttle valve in the flue gas duct between the boiler and the chimney.

Indicative values of the chimney cross section dimensions:

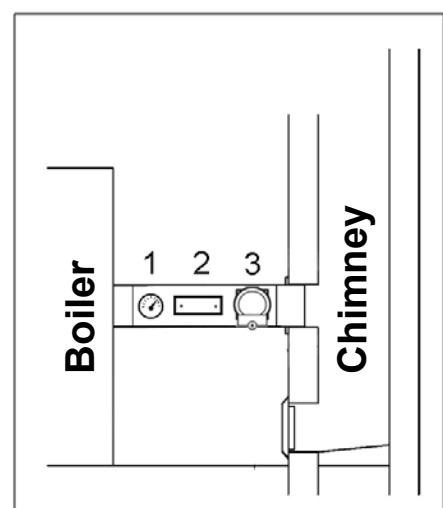
20 x 20 cm	height 7 m
Ø 20 cm	height 8 m
15 x 15 cm	height 11 m
Ø 16 cm	height 12 m

Exact chimney dimensions are stipulated in standard ČSN EN 73 4201. Specified chimney draught is stated in section 3 „Technical Data“.

## 10. Flue-gas duct

The flue-gas duct must be connected into the chimney vent stack. If the boiler cannot be connected to the chimney directly, the appropriate flue-gas duct extension must be as short as possible in the given circumstances, but not longer than 1m, it must be without additional heating surface and must incline upwards in the direction towards the chimney. Flue-gas ducts must be mechanically durable and sealed against combustion products and gas penetration, and it must be possible to clean them inside. The flue-gas ducts must not be lead through another person's apartment or property. The internal diameter of the flue-gas duct must not be larger than the internal diameter of the chimney intake and it must not decrease in width in the direction towards the chimney. Use of elbow-pipes is not suitable. Methods for providing flue-gas duct entries through flammable material structures are stipulated in appendices 2 and 3 of the Czech standard ČSN 061008. These are appropriate for mobile installations, wooden cottages etc.

- 1 - Flue gas thermometer
- 2 - Cleaning aperture
- 3 - Throttle valve (draught limiter)



In case of excessive chimney draught, install draught regulator (limiter) /3/.

## 11. Fire prevention during installation and use of heating appliances

Selected from ČSN 061008 – Fire safety of local appliances and heat sources.

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### Safe distances

When installing the appliance, keep a minimum safe distance of 200 mm from building materials. This distance is valid for boilers and flue-gas ducts positioned near flammable materials of the B, C1 and C2 flammability class materials (the flammability classes are listed in chart 1). It is necessary to double the 200 mm safe distance if the boilers and flue-gas ducts are placed near flammable materials of C3 class (see chart 1). It is also necessary to double the safe distance if the flammability class of the material in question cannot be determined. The safe distance can be decreased to one half (to 100 mm) if a heat insulating, non-combustible screen (asbestos board) of a 5 mm minimum thickness, is placed 25 mm from the protected combustible material (so called flammable insulation). The screening board or protection screen (on the protected object) must exceed the boiler outline including its flue-gas duct on each side by at least 150 mm and by at least 300 mm above its upper surface. The screening board or protection screen must be also used for all fixtures and fittings from combustible materials in cases where the safe distance cannot be maintained (such as in mobile structures or wooden cottages etc. - for more details see ČSN 061008 standard). The safe distance must be maintained even when placing fixtures and fittings near the boilers.

If boilers are placed on floors from combustible materials, the floor must be fitted with a non-combustible, heat insulating pad exceeding the boiler's ground-outline on the side where the stoking and ash-pan apertures are, by at least 300 mm (in front of the aperture) and on all the other sides by at least 100 mm. The non-combustible, heat insulating pad can be made from any material of A flammability class.

Chart 1

Flammability classes of building materials and products	
A – non-combustible	granite, sandstone, concrete, bricks, ceramic tiles, mortars, fireproofing plasters etc.)
B – non-easily flammable	Akumin, Izomin, Heraklit, Lignos, basalt felt boards, fibre-glass boards, Novodur
C1 – low degree of flammability	deciduous tree wood (oak, beech), Hobrex boards, plywood, Sirkolit, Werzalit, hardened paper (Formica), Ecrona
C2 – medium degree of flammability	coniferous tree wood (pine tree, larch, spruce), chipboards and cork boards, rubber flooring (Industrial, Super)
C3 – high degree of flammability	fibreboards (Hobra, Sololak, Sololit), cellulose materials, polyurethane, polystyrene, polyethylene, foamed PVC



In circumstances when there is a risk of temporary access of flammable gases or fumes, or during works when a temporary fire or explosion risk may possibly occur (such as gluing linoleum, PVC etc.) the boilers must be put out of operation long enough before the risk occurrence. **No items from flammable materials may be placed on the boilers or near them for a distance lower than the specified safe distance (more see ČSN EN 13501-1).**

## 12. Connecting boilers to the electrical power network

The boilers are connected to 230 V, 50 Hz mains with a mains cable without a plug. The mains supply cable in case of repair it must be replaced with the same type by the servicing organization. Connection, maintenance and reparation can be made only by a qualified person in accordance with valid regulations of the particular country.



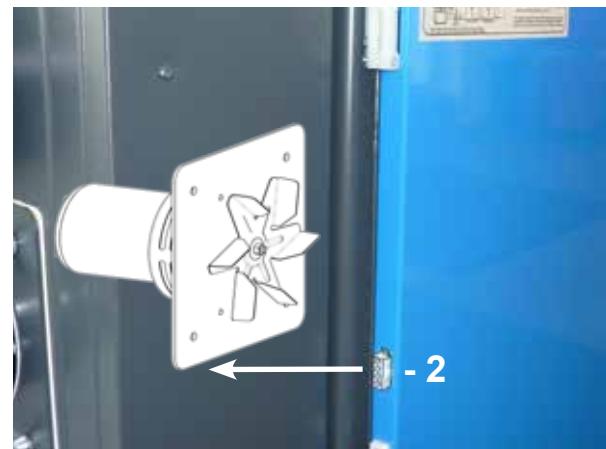
**CAUTION** - The mains cable must not be equipped with a plug (designed to be connected to a socket). It must be connected in a fixed way to a switchboard or junction box to avoid confusion of the conductors.

Mains cable must be regularly checked and maintained in the prescribed condition. It is forbidden to interfere in to the safety circuits and elements for safe and reliable operation of the boiler. If any damage of electrical equipment must be the boiler out of operation, disconnect from the mains and ensure a qualified repair according to applicable standards and regulations.

### Connectors in side hoods of the boiler:



Connector in the right side hood

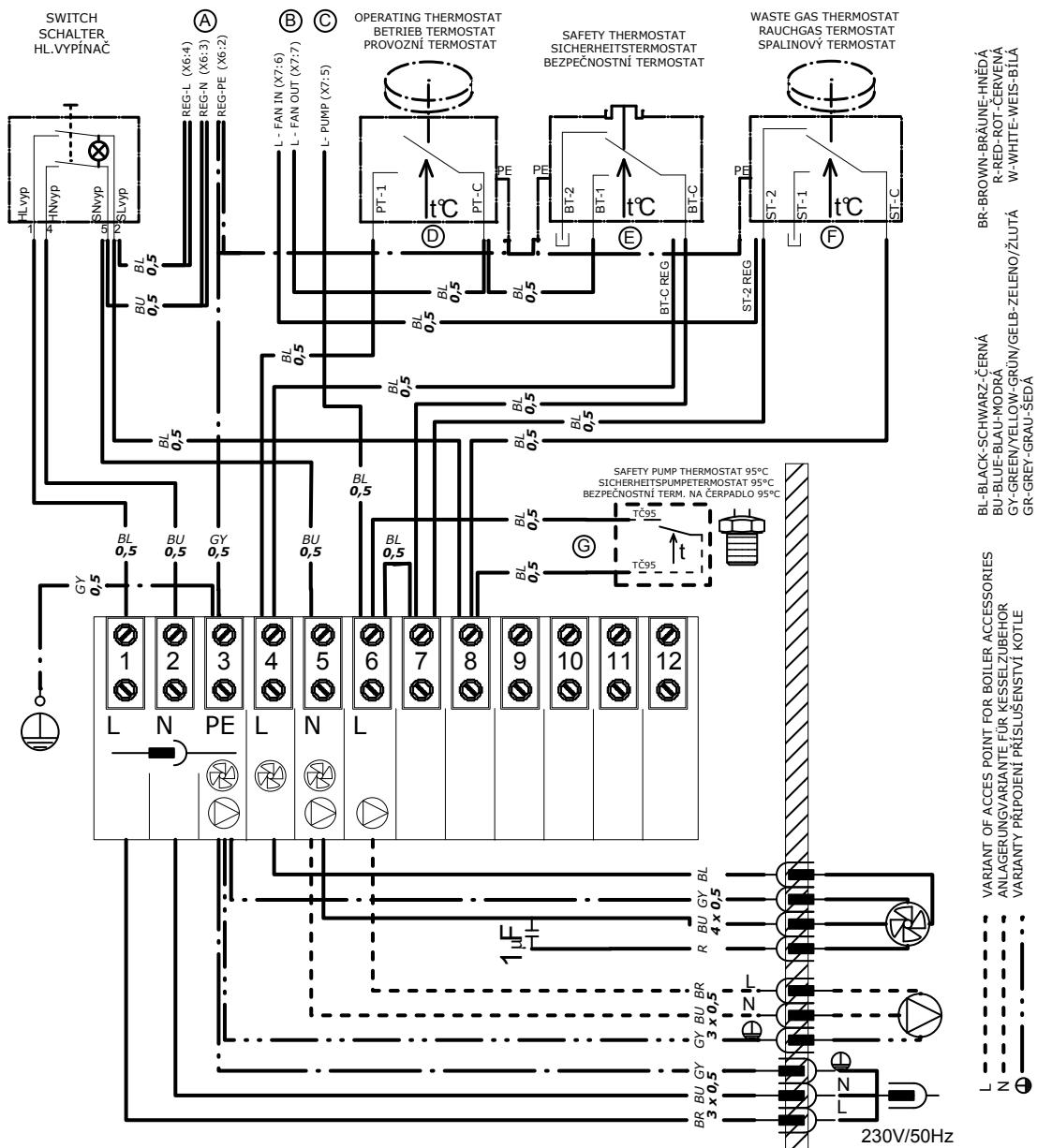


Connector in the left side hood

**1** - connector for income cabel (L - brown, N - blue, PE - green/yellow)

**2** - connector for exhaust fan

## 13. Wiring diagram of electromechanical regulation with extraction ventilator (DC18GD – DC50GD), valid from 12/2007



**WHEN USE ELECTRONIC REGULATION MUST BE THESE CHANGES OF WIRING:  
BEI DER STEUERUNG DES KESSELBETRIEBS DER ELEKTRONISCHE REGELUNG MÜSSEN DIESSE ÄNDERUNGEN MACHEN SEIN  
PŘI ZAPojení ELEkTRONICKÉ REGULACE PROvĚDĚT TyTO ZMĚny:**

**A** VARIANTS OF RESERVOIR POINTS "REG L,N,PE" (FERRULE/FASTON 6,3) FOR ELECTRONIC REGULATION  
SPEISEKLEMMEVARIANTEN "REG L,N,PE" (ADERDERRHÜLSE/FASTON 6,3) FÜR ELEKTRONISCHE REGELUNG  
VARIANTY NAPAJECÍCH SVOREK "REG L,N,PE" (DUTINKA/FASTON 6,3) PRO ELEKTRONICKOU REGULACI

**B** RESERVOIR POINT "L - FAN IN" AND L - FAN OUT" OF BOILER FAN TO THE ELECTRONIC REGULATION  
SPEISEKLEMME "L - FAN IN" UND "L - FAN OUT" DER KESSELGEBLÄSE FÜR DIE ELEKTRONISCHE REGELUNG  
PŘIPOJOVACÍ SVORKA "L - FAN IN" A "L - FAN OUT" KOTLOVÉHO VENTILÁTORU DO ELEKTRONICKÉ REGULACE

**C** RESERVOIR POINT "L-PUMP" OF BOILERPUMP TO THE ELECTRONIC REGULATION  
SPEISEKLEMME "L-PUMP" DER KESSELPUMPE FÜR DIE ELEKTRONISCHE REGELUNG  
PŘIPOJOVACÍ SVORKA "L-PUMP" KOTLOVÉHO ČERPADLA DO ELEKTRONICKÉ REGULACE

**D** WHEN ELECTRONIC REGULATION CONTROL BOILER FAN - CONNECTORS "PT-C" A "PT-1" MUST BE UNCONNECT  
DEN KONNEKTOREN "PT-C" UND "PT-1" ABKLEMMEN BEI DER KESSELGABLESBEIDENUNG DER ELEKTRONISCHE REGELUNG  
KONEKTORY "PT-C" A "PT-1" ODPOJIT PŘI OVLÁDÁNÍ KOTLOVÉHO VENTILÁTORU ELEKTRONICKOU REGULACÍ

**E** WHEN ELECTRONIC REGULATION CONTROL BOILER FAN - CHANGE CONNECTOR "BT-C" FOR CONNECTOR "BT-C REG"  
DEN AUSWECHSELN KONNEKT."BT-C" FÜR KONNEKT."BT-C REG" BEI DER KESSELGABLESBEIDENUNG DER ELEKTRON. REG.  
PŘEHODIT SVORKY "BT-C" ZA "BT-C REG" PŘI OVLÁDÁNÍ KOTLOVÉHO VENTILÁTORU ELEKTRONICKOU REGULACÍ

**F** WHEN ELECTRONIC REGULATION CONTROL BOILER FAN/PUMP - CHANGE CONNECTOR "ST-2" TO CONNECTOR "ST-2 REG"  
DEN AUSWECHSELN KONNEKTOR "ST-2" FÜR KONNEKT."ST-2 REG" BEI DER GÄBLÄSE/PUMPE BEIDIENUNG DER ELEKTRON. REGELUNG  
PŘEHODIT SVORKY "ST-2" ZA "ST-2 REG" PŘI OVLÁDÁNÍ KOTLOVÉHO VENTILÁTORU/ČERPADLA ELEKTRONICKOU REGULACÍ

**G** WHEN ELECTRONIC REGULATION CONTROL BOILERPUMP - CONNECTORS "TC95" MUST BE UNCONNECT  
DEN KONNEKTOREN "TC95" ABKLEMMEN BEI DER KESSELPUMPE BEIDIENUNG DER ELEKTRONISCHE REGELUNG  
KONEKTORY "TC95" ODPOJIT PŘI OVLÁDÁNÍ KOTLOVÉHO ČERPADLA A ELEKTRONICKOU REGULACÍ

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## 14. Obligatory standards dealing with boiler designing and boiler assembly

ČSN EN 303-5	- Solid fuel boilers for central heating
ČSN 06 0310	- Central heating, designing and assembly
ČSN 06 0830	- Safety devices for central heating and hot potable water heating
ČSN EN 73 4201	- Designing chimneys and flue-gas ducting
ČSN EN 1443	- Chimney structures – general requirements
ČSN 06 1008	- Fire safety of local appliances and heat sources
ČSN EN 13501-1	- Fire classification of construction products and construction of buildings - Part 1
ČSN EN 1264-1	- Floor heating – Systems and components – Definitions and symbols
ČSN EN 1264-2	- Floor heating – Systems and components – Heat output calculation
ČSN EN 1264-3	- Floor heating – Systems and components – Designing
ČSN EN 442-2	- Heaters – Testing and test analysis

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### Standards for evaluation of conformity and other technical standards:

ČSN EN ISO 12100:2012, ČSN EN 953+A1:2009, ČSN EN ISO 11202:2011, ČSN EN ISO 3746:2011, ČSN ISO 1819:1993, ČSN EN 60335-1ed.2:2003



**CAUTION – the boiler must be installed in compliance with a design prepared in advance. Installation may only be carried out by persons trained by the manufacturer.**

## 15. Choice and connection method of control and heating elements

Boilers are provided to the user with the basic boiler performance control elements compliant with requirements for convenient heating and its safety. The regulation ensures that the required temperature of the water exiting the boiler (80 - 90 °C) is adhered to. The control of mixing valves and pumps is not solved. Connection of these elements is illustrated in the wiring diagram. Each pump in the system must always be controlled by an individual thermostat to avoid a temperature drop of water returning to the boiler under 65 °C. When connecting the boiler without an accumulation tank or equalizing tank, the pump placed in the heated building circuit must be switched on and off by an individual thermostat or electronic regulation so that it only operates when the pump in boiler circuit operates. If two thermostats are used – each for switching one pump – set the thermostat that switches the heated building circuit pump, to 80 °C, and the thermostat that switches the boiler circuit pump, to 75 °C. Both pumps may only be switched by one thermostat. We recommend to switch the pump in the boiler circle by the means of flue gas thermostat built in the boiler (during fire-up), if the boiler is connected with the accumulation tanks and Laddomat 21/22 and the if the gravity water circulation which prolongs the required temperature build up functions well in the boiler circle. When switching the pump in the boiler circle by using the flue gas thermostat built in the boiler panel, we recommend to install safety thermostat on the 95 °C pump (see electric wiring diagrams). Thermostat in the boiler can be alternatively replaced with an attaching thermostat on the boiler outlet which connects the pump in the boiler circle when the temperature rises to 95 °C (parallel connection with the flue gas thermostat).

Setting the required water temperature for the building is always achieved by means of a three-way mixing valve. The mixing valve can be regulated manually or by electronic regulation, which

contributes to a more convenient and economical operation of the heating system. The connection of all the elements is designed to suit specific conditions of the heating system. Electric installations related to the additional equipping the boilers with the above mentioned elements must be carried out by an expert in compliance with valid ČSN EN standards.



When installing the boiler, we recommend using a closed expansion tank. However, an open tank may also be used if permitted in the standards of the specific country. The boiler must always be installed in a way which prevents overheating (and subsequent damage) even during a power cut. It is because the boiler has certain momentum.



There are several ways of protecting the boiler from overheating. Connecting an overheat prevention cooling loop with a TS 131 3/4 ZA (95 °C) or WATTS STS 20 (97 °C) valve to the public water system. In cases of personal wells, the boiler can be additionally protected by using a back-up power supply (battery with an exchanger) for operation back up of at least one pump. Another option is connecting the boiler to an after-cooling tank and reversal zone valve.



**When installing the boiler, position the rear section 10 mm higher in order to facilitate circulating and air-bleeding.**

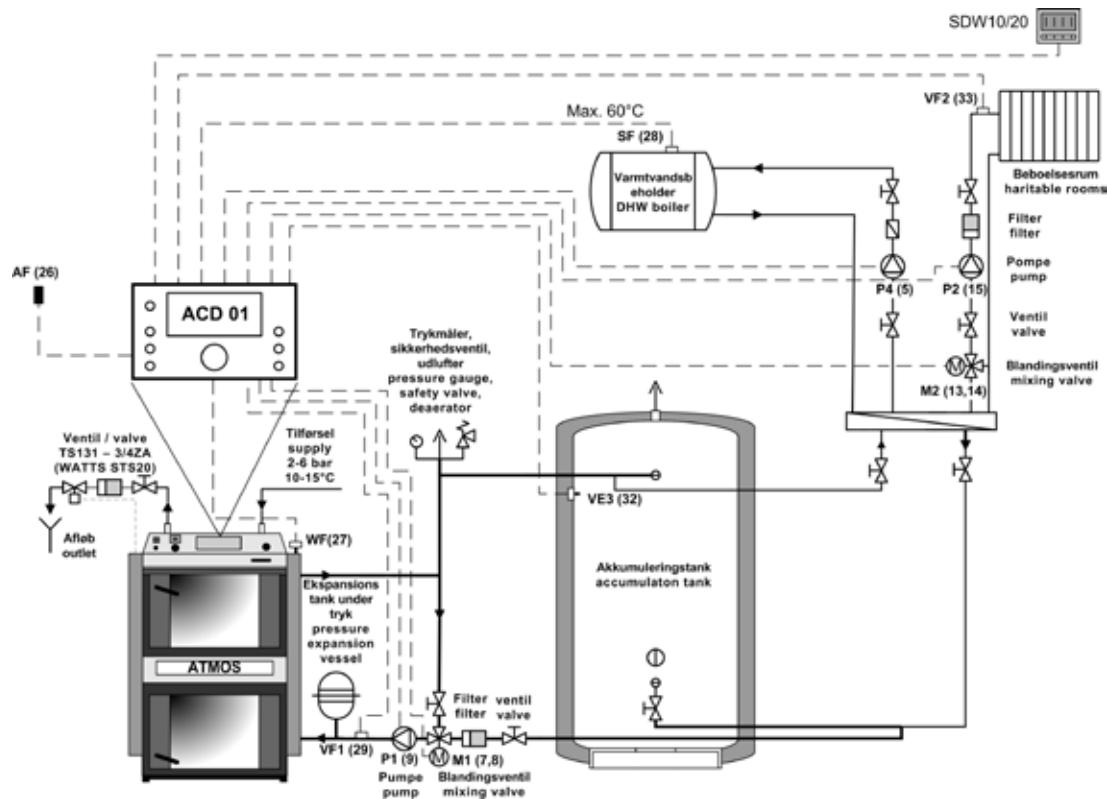
**For the heating system regulation we recommend regulation elements provided by the following companies:**

- a) ATMOS ACD 01 - Eqvithermal controller set for solid fuel boilers
- b) KOMEXTHERM, Praha tel.: +420 235 313 284
- c) KTR, Uherský Brod tel.: +420 572 633 985
- d) Landis & Staefa tel.: +420 261 342 382

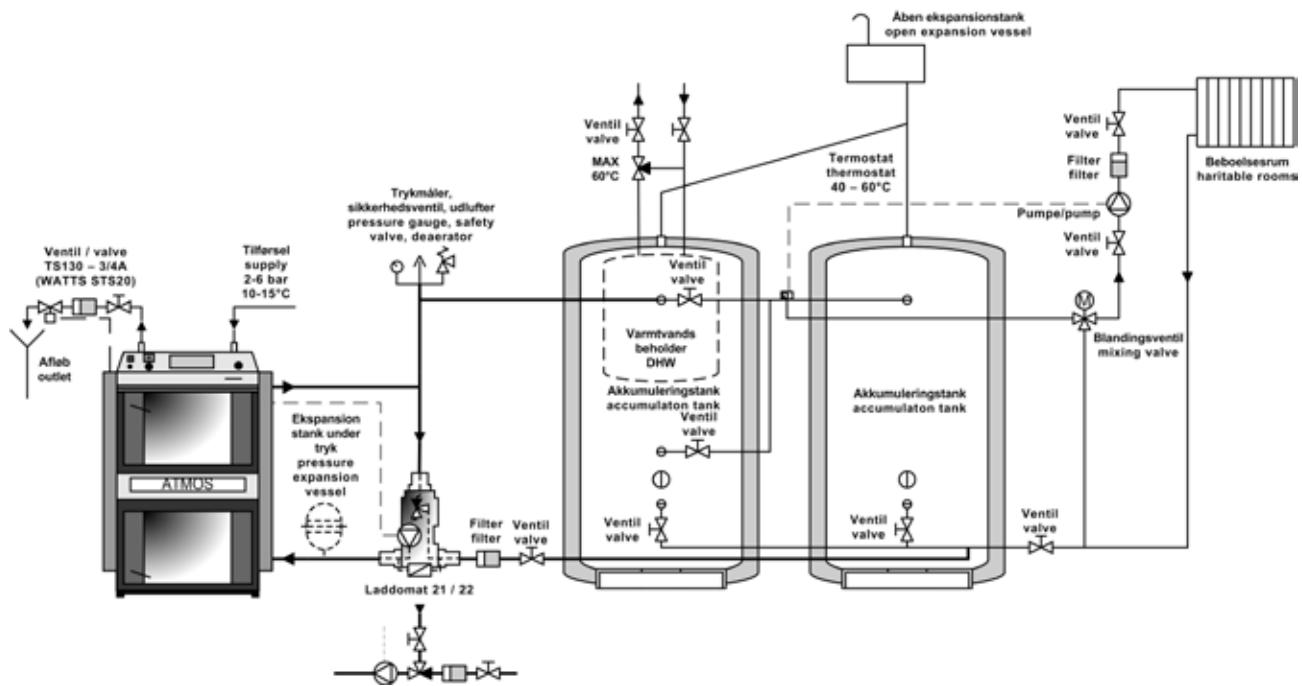
## 16. Boiler corrosion protection

The specified solution is connecting the boiler with **Laddomat 21/22** or with a thermoregulatory valve, which can separate the boiler circuit from the heating circuit (primary and secondary circuits), and provide **minimum of 65 °C for water returning to boiler**. The higher the temperature of water returning to the boiler, the fewer tars and acids condensing; which damage the boiler. **Temperature of the outgoing water must permanently range between 80 - 90 °C**. The combustion products (flue gas) temperature must not drop **below 110 °C** during normal operation. Low flue gas temperature causes condensation of tars and acids even when the specified outgoing water temperature of (80 - 90 °C) and returning water temperature of (65 °C) are adhered to. These conditions may occur when using the boiler to heat domestic hot water (DHW) in summer, or when heating only a section of the building. In this case we recommend connecting the boiler with accumulation tanks, or daily firing-up. For outputs of 15 - 100 kW it is also possible to keep the minimum temperature of the returning water (65 - 75 °C) by utilising a three-way mixing valve with an electric actuator and electronic regulation.

## 17. Prescribe boiler connection with an accumulation tank and electronic controller ACD01



## 18. Recommended boiler connection with Laddomat 21/22 or thermoregulatory valve and accumulation tanks



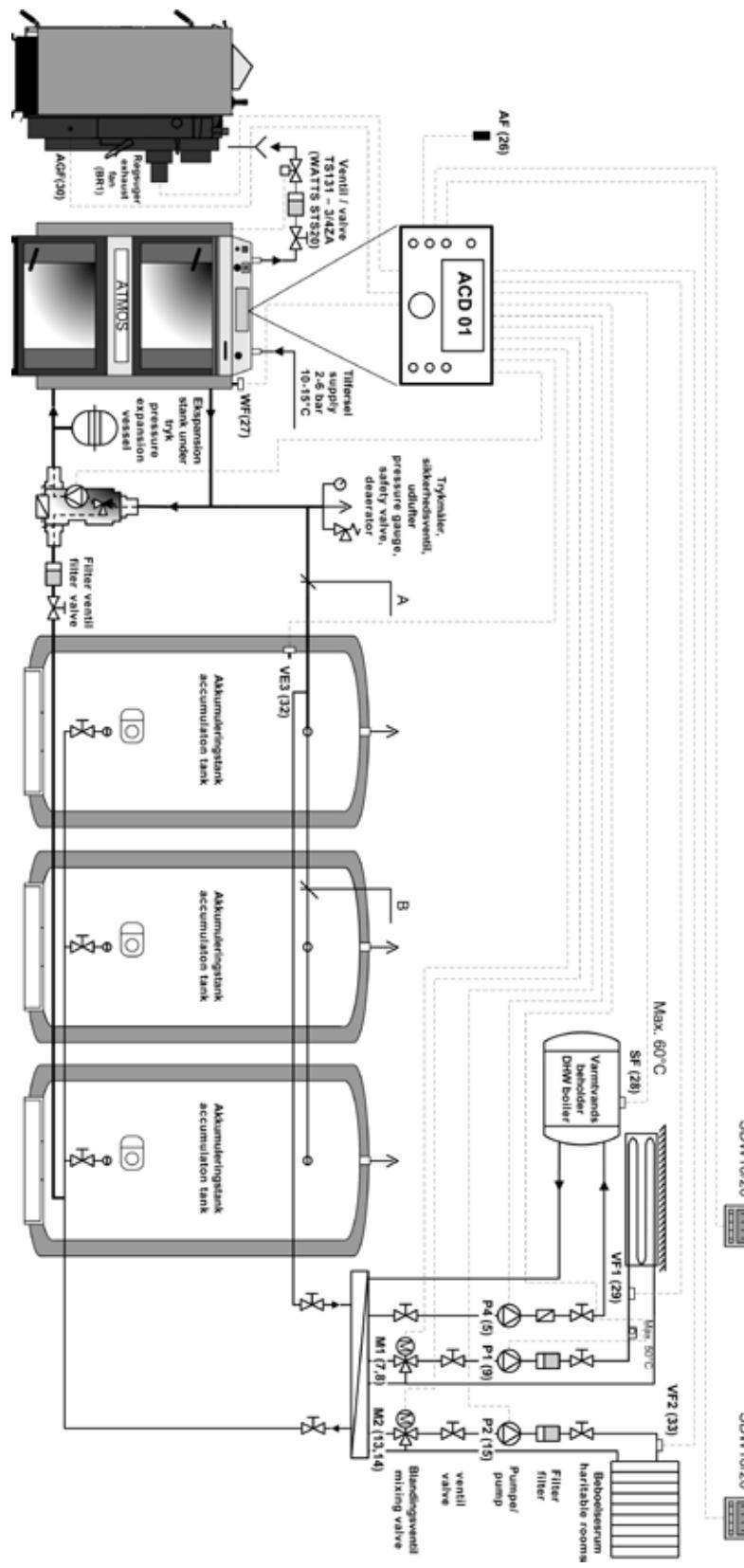
## 19. Boiler connection with an accumulation tanks and electronic controller ACD01

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When connecting the boiler with Laddomat 21/22 and accumulation tanks, we recommend to switch the Laddomat 21/22 pump with an flue-gas thermostat build in the boiler, see section 15, page 17.

### Minimal pipeline diameters if connected with accumulation tanks

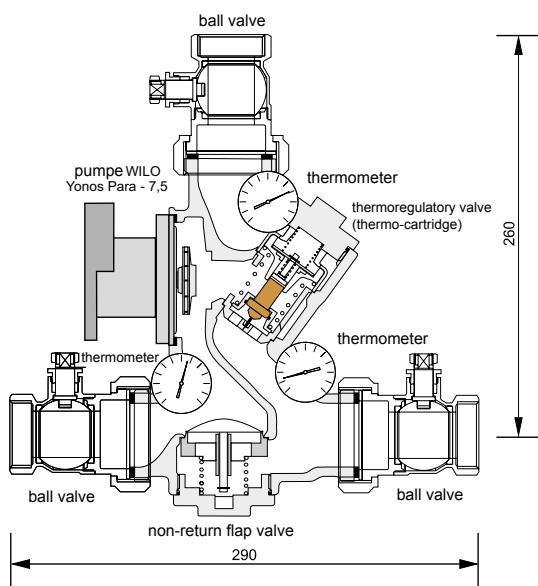
Boiler type and output	section A		section B	
	in copper	in steel	in copper	in steel
15 – 25 kW	28x1	25 (1")	28x1	25 (1")
30 – 40 kW	35x1,5	32 (5/4")	28x1	25 (1")
40 – 50 kW	42x1,5	40 (6/4")	35x1,5	32 (5/4")
50 – 75 kW	54x2	50 (2")	42x1,5	40 (6/4")



SDW10/20

SDW10/20

## 20. Laddomat 21/22



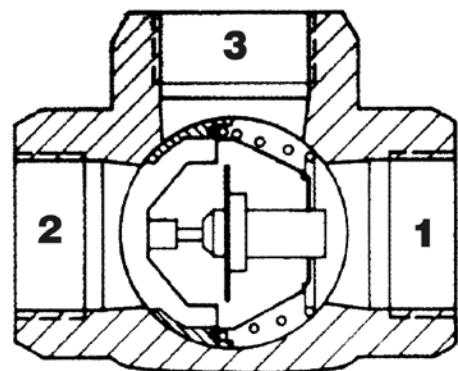
With its construction, Laddomat 21/22 replaces the traditional connection composed of individual parts. It is composed of a cast-iron body, thermoregulatory valve, pump, non-return flap valve, ball valves and thermometers. When the water temperature reaches 78 °C, the thermoregulatory valve opens the water supply from the accumulation tank. The connection with Laddomat 21/22 is considerably easier and therefore, we recommend it. A spare thermo-cartridge of 72 °C is supplied with the Laddomat 21/22 device. It is used for boilers over 32 kW.

OPERATION DATA	
<b>Max. operating pressure</b>	0,25 MPa
<b>Design pressure</b>	0,25 MPa
<b>Test over pressure</b>	0,33 MPa
<b>Highest operating temperature</b>	100 °C



**WARNING - Laddomat 21** is designed only for boilers with output up to 75 kW (inclusive). We recommend using it only with boilers with output **up to 50 kW (inclusive)**. For boilers with an **output from 15 up to 100 kW** we recommend using **Laddomat 22**, which is factory fitted with thermo-cartridge of 78 °C.

## 21. Thermoregulatory valve



Thermoregulatory valve type, TV 60 °C (65/70 °C) is used with solid fuel boilers. When the boiler water temperature reaches + 60 °C, the thermoregulatory valve opens and fluid from the building heating circuit (2) enters the boiler circuit (3 → 1). Inlets 1 and 3 always remain open. This ensures that the minimum temperature of the water returning to the boiler is maintained. If need be, a thermoregulatory valve set to a higher temperature (E.g. 72 °C) may be used.

### Recommended sizes of the thermoregulatory valve TV 60/65/70 °C.

For boilers: DC18GD, DC25GD.....	DN 25
DC30GD, DC40GD.....	DN 32
DC50GD.....	DN 40

## 22. Operating a system with accumulation tanks

Ignite the boiler and allow the accumulation tanks to “charge” to the required water temperature of 90 - 100 °C by the boiler’s maximum output operation (2 to 4 loads). Then leave the boiler to stop burning. Then keep withdrawing heat from the accumulation tank utilising three-way valve for a period of time corresponding to the size of accumulation tanks and the external temperature. In the heating season (and if adhering to specified min. accumulation tanks volumes – see chart) this could take 1 - 3 days. If the accumulation method cannot be used, then we recommend using at least one tank of 500 - 1000 l volume for equalising the boiler start-ups and run-outs.

RECOMMENDED MINIMUM ACCUMULATION TANK VOLUMES			
Output	19 - 25	30 - 40	40 - 50
Volume	1500 - 2000	2000 - 3000	3000 - 4000

### The standard ATMOS accumulation tanks provided

TANK TYPE	VOLUME (l)	DIAMETER (mm)	HEIGHT (mm)
<b>AN 500</b>	500	600	1970
<b>AN 750</b>	750	750/790*	2010/1750*
<b>AN 800</b>	800	790*	1910*
<b>AN 1000</b>	1000	850/790*	2065/2210*

\* type DH

### Tank insulation

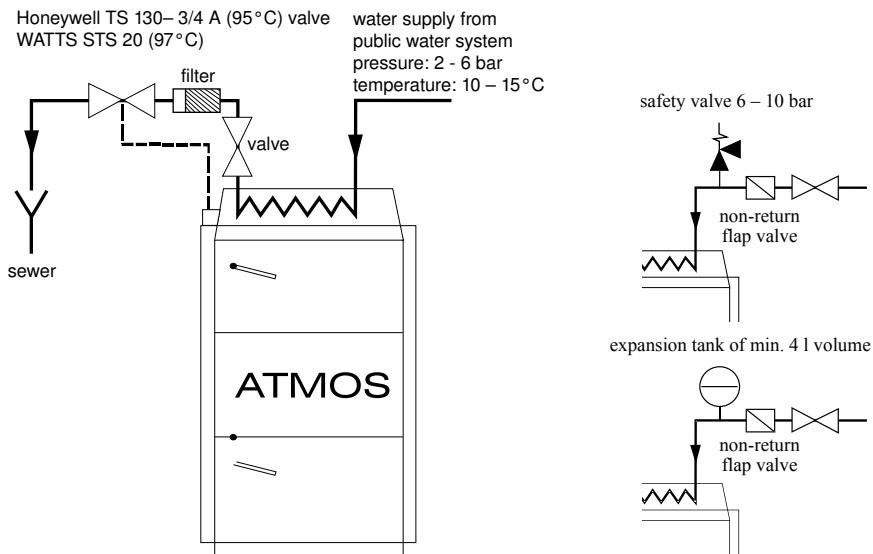
A suitable solution is joint mineral wool insulation of the particular number of tanks (of required volume) placed together into a plasterboard structure, or additional filling with granular insulation. When using the mineral wool, the specified minimum insulation thickness is 120 mm. Another option is purchasing tanks in a leather-cloth housing insulated by mineral wool (see the price list).

### Advantages

The installation with accumulation tanks provides several advantages:

- lower fuel consumption (by 20 – 30 %), the boiler operates in full output and at an optimal effectiveness of 81 - 89 % until the complete combustion of the fuel
- prolonged boiler and chimney service life – minimum formation of wood-tars and acids
- possibility to combine it with other heating methods – accumulated electric power, solar collectors
- combination of wall radiators and floor heating
- convenient heating and ideal fuel combustion
- environmentally friendlier heating

## 23. Connection of overheat protecting cooling loop with a safety valve Honeywell TS 131 - 3/4 ZA or WATTS STS20 (valve opening temperature 95 - 97 °C)



**ATTENTION - cooling loop to prevent overheating must be used in compliance with ČSN EN 303-5 only for overheating prevention (never for heating up warm service water).**

The TS 131 - 3/4 ZA or WATTS STS 20 valves, the sensor of which is placed in the rear of the boiler, prevent overheating in the following way: if the boiler water temperature rises above 95 °C, the valve opens and allows water from public water supply system to enter the cooling loop. This water then absorbs the excessive energy and exits to the sewer. In case that a non-return flap valve has been installed to the cooling loop water inlet for the purpose of preventing reversed water flow (which might be caused by pressure drop in the public water supply system), the cooling loop must be fitted with a 6 – 10 bar safety valve or with an expansion vessel of minimum 4 l volume. The boiler must be protected against overheating at all times. If not, its damage or burst may occur.

## 24. Operating instructions

### Preparing boilers for operation

Before putting boilers into operation, it is necessary to ensure that the system has been filled with water, and air-bled. Wood boilers must be operated in compliance with the instructions stipulated in this manual so that satisfactory and safe functioning is achieved. They can only be operated by adults.

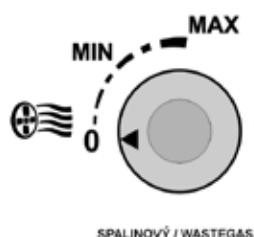
### Ignition and operation

Before firing up, open the ignition valve /13/ by pulling the ignition valve pulling rod /17/ and reduce the flue gas thermostat for the ignition (to minimum - 0 °C) by this you switch the exhaust fan on. Through the stocking (upper) door /2/ insert dry wood kindling on the heatproof shaped piece /5/. Place the kindling perpendicularly to the channel recess in the shaped piece so that a 2 – 4 cm gap between the recess and fuel is created; which allows the flue gas passage. Place paper or wood wool

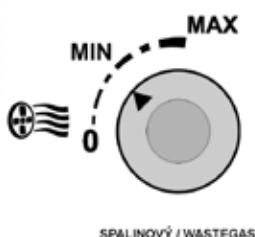
on top of the kindling, then another layer of kindling and larger amount of dry wood. After ignition close the top door and open the lower door. When the fuel has caught sufficient fire, close the lower door, fill the accumulation tank completely with fuel and close the ignition valve with its pulling rod /17/. Set the flue gas thermostat into the operating position which it is necessary to determine for ideal operation. On the FR 124 draught (output) regulator /22/ set the required outgoing water temperature 80 - 90 °C. If the boiler should work as a gasification appliance, then a layer of glowing charcoal must be kept (known as reduction zone) above the gasifying nozzle. This can be achieved by burning dry firewood of suitable size. When burning moist wood, the burner does not operate as a gasification appliance, the fuel consumption increases dramatically, the boiler does not reach the required output and the service life of both - the boiler and the chimney - decreases. **If the specified chimney draught is adhered to, the boiler operates up to 70% output without the ventilator.**

## Flue (waste) gas thermostat setting

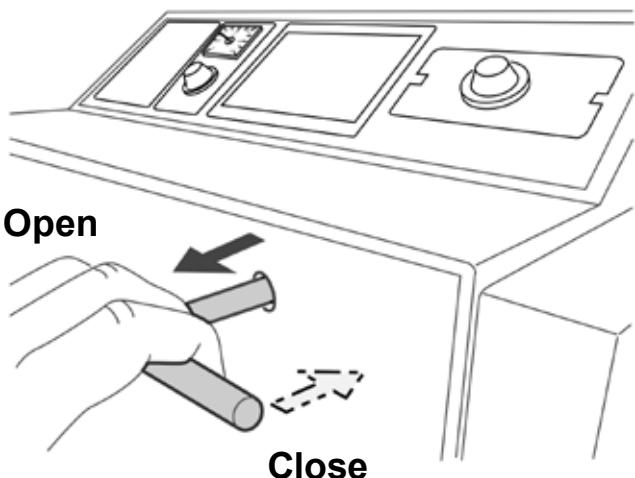
### Firing-up



### Operation



### Ignition valve operating



**NOTE** – when burning wood for the first time, condensation occurs and condensed fluid leakage occurs – this is not a defect. Condensation will disappear later. When burning small wood flue particles, it is necessary to monitor the flue gas temperature which must not exceed 320 °C. Otherwise, the ventilator (S) may sustain damage. **Wood-tar and condensate formation in the hopper is a side effect of wood gasification.**



**ATTENTION** – during operation, all doors must be shut and the ignition valve pulling rod must be inserted, otherwise the ventilator (S) may sustain damage.

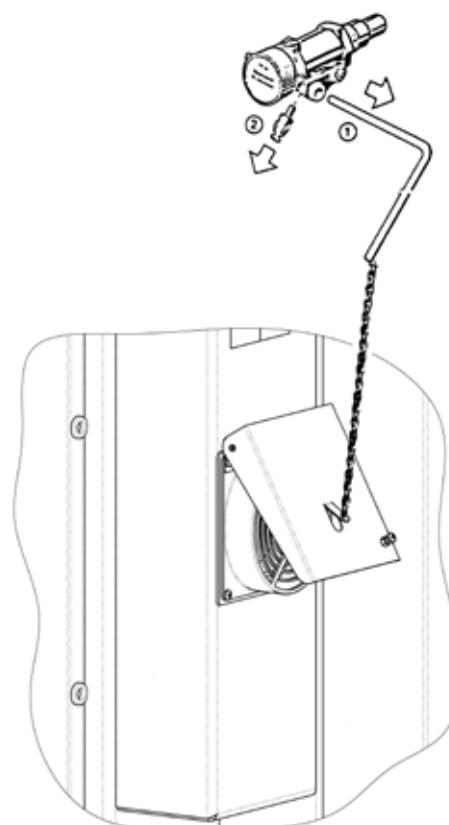
## Output regulation - electromechanical

Output regulation is achieved by means of a control flap valve /8/ operated by the FR 124 draught regulator /22/ which automatically opens up or shuts down the valve /8/; depending on the pre-set outgoing water temperature (80 - 90 °C). The output (draught) regulator adjustment should be done carefully because it not only regulates the output; but also protects the boiler against overheating. The setting

should be in compliance with the enclosed „Assembly and Setting Instructions“ for the HONEYWELL Braukmann FR 124 type regulator. The overheat protection function can be monitored by checking the regulator's functionality at temperature of 90 °C. At this temperature, the control valve /8/ must be almost closed. It is necessary to seek and discover the best setting. You can visually inspect the control valve's /8/ position by looking from the rear side of the exhaust fan. The exhaust fan is controlled by a operating (control) thermostat situated on the boiler's panel. The regulation is based on the pre-set outgoing temperature value. The temperature set on the thermostat should be 5 °C lower than the temperature set on the FR 124 draught regulator. (Indicated by dots on the thermostat scale). The control panel also comprises of a flue gas thermostat which is used to switch the ventilator off when the fuel has been combusted. When igniting, position to the “firing-up” position (minimum value). When the fuel has sufficiently flared up, set it to the operating position in which the ventilator runs until the fuel has completely burnt out. It is necessary to seek and discover an optimal position of the thermostat; which depends on type of fuel, chimney draught and other conditions. The outgoing water temperature should be monitored on the thermometer /18/ situated on the control panel. There is also an irreversible safety thermostat on the panel.

## Draught regulator - HONEYWELL Braukmann FR 124 – Assembly instructions

Disassemble the lever /1/ and coupler /2/ and screw the regulator into the boiler.



### Setting

Heat the boiler to approx. 80 °C. Set the setting handle to the temperature read on the boiler thermometer. Tension the air flap valve chain in a way that provides the required boiler output; the gap at the air (control) flap valve may range between 3 - 50 mm. The valve minimum gap is set by a setscrew to 3 - 8 mm; boiler service-life prolonging feature, do not decrease. Otherwise, the boiler and ventilator may get covered in tar and their service life would be reduced. In cases where there are insufficient general draught conditions, slightly increase the permissible minimum gap.

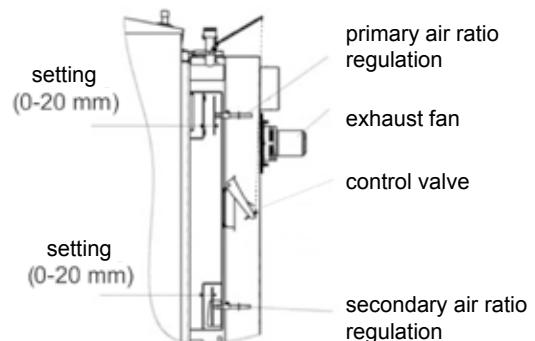
### Draught regulator functional check

Set the setting handle to the required temperature of water exiting the boiler (80 - 90 °C). When the water temperature reaches its maximum of 95 °C, the control flap valve must be fully closed (only providing the setscrew gap). It is always necessary to fine-tune the specified operating temperature (80 - 90 °C) utilising the mixing valves behind the boiler either manually or by electronic regulation with electric actuator.

## 25. Boiler output and combustion setting

The boilers are equipped with a control system which allows separate tuning-up of the amount of the primary air and the secondary air flow rate so that the rated output and proper burning can be achieved when the given conditions are fulfilled. This fine-tuning is carried out by tie-rods which are positioned in the rear part of the boiler on the channel through which the air flows into the boiler and where is also the air regulating flap actuated by the draft regulator FR124. The upper tie-rod is used to adjust the amount of the primary air. The lower tie-rod is used to adjust the amount of the secondary air.

### DC18GD – DC50GD



### Setting the boilers DC18GD – DC50GD

#### Basic setting of primary air:

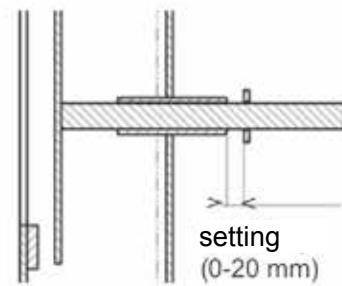
The change of the air volume is performed by pulling or pushing the tie-rod depending on the type of fuel.

#### Hard wood:

Optimum setting: 5 - 10 mm

#### Soft wood:

Optimum setting: 15 - 20 mm



#### Basic setting of secondary air:

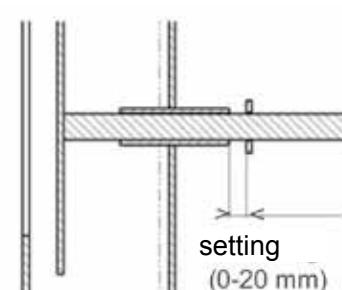
The change of the air volume is performed by pulling or pushing the tie-rod depending on the type of fuel.

#### Hard wood:

Optimum setting: 5 - 10 mm

#### Soft wood:

Optimum setting: 2 - 5 mm



**ATTENTION** - Adjustments to settings should be done on the basis of the flue gas analyzer and maximum temperature; which must not exceed 320 °C at the outlet to chimney, at stabilised nominal output /with closed ignition valve/. The boiler is set to optimal operating parameters by the manufacturer. Therefore, make adjustments to settings only in cases where the operation conditions are non-standard (for example - if insufficient chimney draught, pull the regulator pulling rod to its maximum).

## 26. Procedure for the optimum boiler setting

In order to achieve the best possible results in the emission measurement and the efficiency of the ATMOS boilers, the following basic conditions must be met:

Fuel: Wood

Type of wood: **1. Beech (the best and guaranteed fuel)**

2. Pine, spruce (alternative fuel)

Wood moisture: 12 - 15 % recommended

Wood size: Wooden logs (halves or quarters) with a radius size of **100 to 150 mm**. For the wood length, see the "Instruction Manual" (prescribed length of wood 530 mm  $\pm 20$  mm).

Chimney draft: It must be in accordance with the "Instruction Manual".

DC 18 GD	16 Pa (0,16 mbar)
DC 25 GD	18 Pa (0,18 mbar)
DC 30 GD	20 Pa (0,20 mbar)
DC 40 GD	22 Pa (0,22 mbar)
DC 50 GD	24 Pa (0,24 mbar)

There must be no big changes in pressure during the boiler operation and measurement.  
(e.g. as a result of the wind) **Maximum  $\pm 2$  Pa (0.02 mbar)**.

### Boiler firing-up with wood:

When firing up the boiler, always follow the "Instruction Manual", see Chapter "Firing up and Operation". However, it is good to know that if a sufficiently large amount of small wood is used (splinters and logs), the boiler will sooner reach the nominal output and it will also form a glowing charcoal layer. With a sufficient burning up (15 to 30 minutes from firing up) the loading space must be filled two-thirds with solid fuel. Check the boiler after 60 to 90 minutes whether already a sufficiently large charcoal layer has been formed. (The control is carried out with the naked eye, the solid fuel should not be spread out). If we are not satisfied with the layer, some logs can be added and wait for another 20 to 30 minutes. The charcoal layer must never be covered directly, but always with at least one fuel layer. If we are satisfied, we can load the boiler completely with fuel. Fill the boiler with fuel as soon as possible not to allow the boiler door to stay open long. 15 to 30 minutes after loading with fuel, when the boiler combustion stabilizes, we can start with measurement and final tuning of the combustion. When measuring and between the loading intervals, neither open the upper nor the lower door. The boiler measurement may be carried out only if we convince ourselves before the firing up that the boiler is cleaned properly and the loading and combustion chambers are free of ash. Remember always to check also the firing up flap so that it is closed correctly during operation and seals properly (e.g. that no impurities are sticking to it).

### Emission measurement: By means of the flue gas analyser.

Measuring point: 300 to 500 mm behind the outlet nozzle from the boiler.

Measurement time: The measurement is performed at the nominal output in the steady state of the boiler earliest 120 minutes from the firing-up and 15 to 30 minutes after the loading, see the

above-described process. This time is necessary for the boiler to reach the nominal output and to form the glowing charcoal layer, and the boiler must operate at 100 % as a gasification boiler. This can only be achieved when the boiler is connected with a sufficiently large volume of accumulation tanks, see the "Instruction Manual". If this is not the case, the boiler is operated with respect to the combustion quality neither with nominal or optimum output. It is also important that the heating system is adjusted so that the control and safety thermostat do not switch off the fan during the measurement. If required, the capillaries of the control and safety thermostat can be withdrawn from the boiler body during the measurement. The time of the emission measurement with the user is different; it depends on the specific requirements and regulations of the country where the boiler is installed. Values of individual measurements are always averaged. Therefore, it may happen that the vessel shortly exceeds the permissible limits of CO, but this easily meets the average. Therefore, it depends much on the measuring methodology and time. This is also linked to the quality of the measuring instruments and the overall tightness of the measuring elements (e.g. feeding hoses of the analyser - O<sub>2</sub> high).

### **By the setting of the primary air, especially the boiler output is affected.**

Other than the recommended setting of the primary air is carried out only at an insufficient chimney draft or poor fuel quality. In this case, the boiler does not need to reach the guaranteed parameters of the combustion quality, but the customer will be satisfied with the operation.

### **By the setting of the secondary air, the combustion quality is particularly affected.**

If we find at the flue gas analyser during the measurement that in the steady state (see above) the O<sub>2</sub> content is lower than recommended, we pull the control tie-rod of the secondary air a little out. Thereby, the amount of the secondary air will be increased. Thus, the total amount of O<sub>2</sub> in the exhaust gas rise. As a result a better combustion quality is achieved (CO content in the exhaust gas drops). However, if we overdo it, the O<sub>2</sub> content increases to the extent that the combustion is gradually deteriorated. If the O<sub>2</sub> content is higher than recommended, the secondary air control tie-rod is to be pushed inside. Thereby the amount of the secondary air is reduced. The total amount of O<sub>2</sub> in the exhaust gas will reduce which will lead to an improvement of the quality of combustion (CO content in the exhaust gas is reduced). However, if we overdo it, the O<sub>2</sub> content decreases so far, that the combustion is deteriorated suddenly. It can happen that the recommended amount of O<sub>2</sub> in the flue gas does not exactly match with the needs of the installed boiler thanks to various circumstances and will need to be moderately adapted for the respective boiler and the fuel type. We recommend that you carefully carry out the setting changes from 1 to 3 mm, which requires a certain amount of experience. After a change of setting, we recommend to wait a while. Ideally 5 to 20 minutes.

Changes do not have to show up immediately. It can also happen that the immediate reactions are different than expected and the actual improvement comes only after a certain time. We should also expect that if the fuel gets stuck in the loading chamber or the gasification nozzle will be clogged due to improper fuel or loading, it may happen that you do not succeed to set the boiler on the first attempt in an optimal way. In that case you should repeat everything once more. The fuel must never be swaged. It always depends on the experience of the technician who adjusts the boiler and puts it into service. This is heating with solid fuels and it sometimes may be unpredictable.

## Recommended O<sub>2</sub> values in the exhaust gas the boiler type dependent:

The optimum amount of O<sub>2</sub> is a bit different for each boiler. However, the result must be the best possible boiler combustion in the entire combustion interval. Not only in the first, but also in the second heating hour. **We recommend keeping the O<sub>2</sub> content in the range from 5 to 8 %.**

Special features: After the boiler is charged with fuel, the O<sub>2</sub> content can drop to a very low value and the CO content can rise to very high values. However, this is a short term side effect when loading the fuel. Therefore, it is necessary to wait 15 to 30 minutes after loading the fuel, until the O<sub>2</sub> content stabilizes in the exhaust gas. A too far drawn out primary air control tie-rod can lead to reduction of the glowing carbon layer in the boiler and thereby to a deterioration in the quality of combustion, and to increase the O<sub>2</sub> content in the exhaust gas. As well, the setting of the ratio of primary and secondary air is different for hard and soft wood. When heating with soft wood, the use of smaller pieces of wood is recommended for a better charcoal formation.

## 27. Fuel refill

Before fuelling, open the ignition valve /13/ with the pulling rod /17/. Do not switch the extraction ventilator off. Wait for approximately 10 seconds and slowly open the loading door /2/ so that any accumulated gases are first vented off into the flue-gas duct and not in the boiler room. Cover the glowing charcoals with a wide log. Do not press the fuel on the gasifying nozzle, it can put the flame out. Always fill the hopper completely. In order to prevent excessive smoke formation, load new batch of fuel only after the previous fuel has combusted to at least one third of the loading volume.



**CAUTION – during operation, the ignition valve pulling rod must be retracted, otherwise damage to the ventilator (S) will occur.**

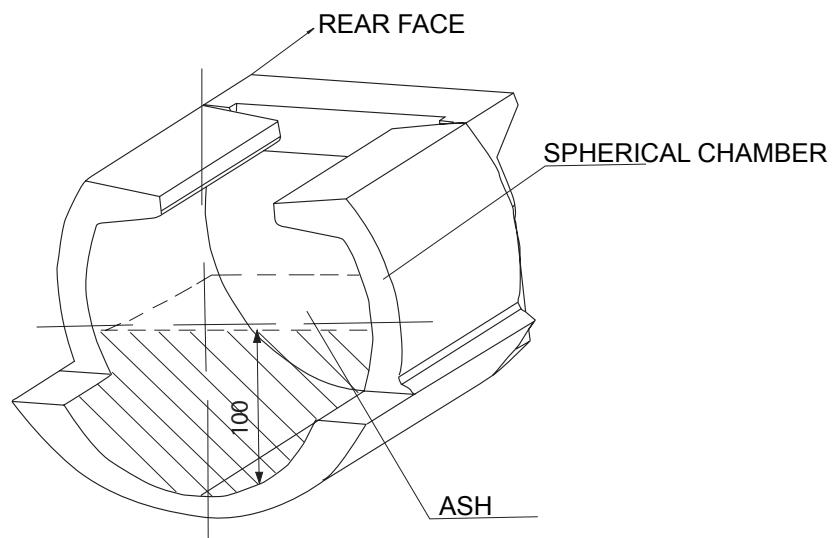
## 28. Boiler cleaning

**It is necessary to clean the boilers regularly and thoroughly every 3 to 7 days because the flue ash accumulated in the fuel stocking chamber (upper chamber) together with tars and acids dramatically decreases the boiler's service life and output and insulates the heat transfer surface.** If excessive amount of ash in the burning chamber (lower chamber) is left, then the burn out area is insufficient and damage of the nozzle holder or whole the boiler may occur. Carry out the cleaning procedure by first switching the exhaust fan on (turn the flue gas thermostat to minimum - 0 °C). Then open the stocking door /2/ and sweep the ash down through the slot into the lower chamber. Leave long pieces of wood which has not fully combusted (charcoals) in the hopper for the next time the boiler is used. Open the cleaning lid /15/ and clean the rear duct with a brush. If the flue gas brake (turbulator) is inserted in the flue duct (tube exchanger), it must be removed before cleaning. Remove all the soot and ash after opening the lower lid /15/. Open the lower door /3/ and clean the lower chamber from ash and soot. Remove the layers of dust on the side walls of the uppe and lower combustion chamber with a poker or a brush. The cleaning interval depends on the fuel quality (wood moisture content), heating intensity, chimney draught and other factors. We recommend cleaning the boilers once a week. Do not pull out the fireclay shaped piece /10/, /14/ when cleaning. At least once a year

clean the exhaust fan rotating wheel (impeler) and via the cleaning hole, inspect the state of the primary to secondary air ratio regulation. If it is necessary, clean using a screwdriver. This influences the combustion quality.



**NOTE** – regular and thorough cleaning is important for permanent stabilised output and a long service life of your boiler. If not cleaned properly, damage to the boiler may occur – the manufacturer's guarantee is rendered invalid



### Maximum ash quantity



Cleaning the upper stoking chamber with the scraper (poker)



Sweeping the ash through the nozzle down into the bottom (cleaning) chamber.  
The opening in the nozzle must be always clean and free.



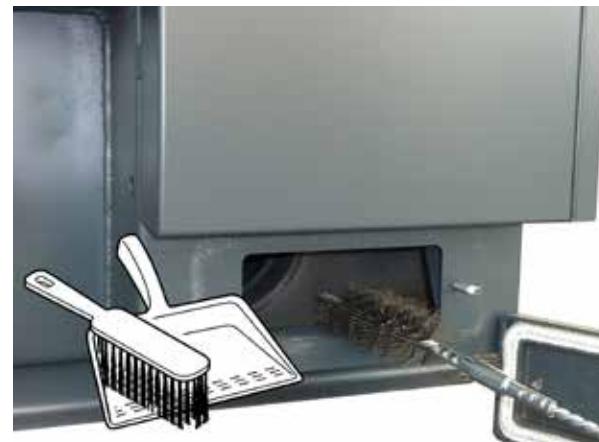
Open bottom space of the boiler with a spherical chamber and example of ash removing with a poker



Open bottom space of the boiler with a spherical chamber and example of ash removing with an ash pan



Sample of cleaning of the flue way with a wire brush - upper lid.  
Remove flue gas brake (turbulators) during cleaning.



Sample of cleaning of the flue way - bottom lid



Sample of cleaning of impeller and checking uprightness of vane on exhaust fan



Checking and cleaning regulation of primary/secondary air ratio via cleaning lid

## 29. Heating system maintenance - including boilers

Inspect at least once every 2 weeks. If necessary, refill the system with water. If the boilers are out of operation during wintertime, a risk of water freezing in the system arises. Therefore, we recommend letting all the water out from the system or fill it with an anti-freeze. In other situations, only let water out if necessary and keep without water for as little time as possible. After the heating season is over, clean the boiler thoroughly and replace damaged parts. Do not leave parts replacement for the last moment; prepare your boiler for the heating season as early as Spring.

## 30. Use and inspections

Boiler operators must always follow the operation and maintenance instructions. Interventions into boilers that could endanger the health of the operators or other persons in the vicinity are prohibited. Boilers may only be operated by a person that is more than 18 years old, that has been acquainted with the instructions and operation of the equipment and that complies with the requirements of § 14 of the Directive no. 24/1984 Coll. The boiler operation needed increased attention to safety in terms of potential burns from hot boiler parts and systems. You must never leave unattended children near boiler that is in operation. During the operation of solid fuel boilers it is prohibited to use any flammable liquids for lighting the fire and it is also prohibited to increase the nominal output of the boiler during operation (overheating). **You must not put flammable objects on the boiler and near the fuel feeding and ash pan openings and ash must be stored in non-flammable containers with a lid.** When handling fuel and ash, wear protective equipment (gloves, dust mask). Boilers in operation must be under occasional supervision of the operator. The user may only carry out repair consisting in simple replacement of a spare part (e.g. a sealing cord, etc.). During the operation check the doors and cleaning openings for tightness and always tighten them properly. The user must not alter the structure and electric installation of boilers. The boiler must always be cleaned properly and in time so that free passage of all the ways can be guaranteed. Cleaning doors must always be properly closed.



**CAUTION** - Follow valid fire regulations and have in reach portable fire extinguisher. If any non-standard behavior of the boiler shut down the boiler from operation and call the service.

## 31. Possible failures and troubleshooting

Failure	Reason	Solution
<b>The “mains” indicator not lit up</b>	<ul style="list-style-type: none"> <li>- no voltage in network</li> <li>- plug incorrectly inserted to el. socket</li> <li>- defective power supply switch</li> <li>- defective electric cord</li> </ul>	<ul style="list-style-type: none"> <li>- check</li> <li>- check</li> <li>- replace</li> <li>- replace</li> </ul>
<b>Boilers do not reach their required outputs and the pre-set water temperatures</b>	<ul style="list-style-type: none"> <li>- not enough water in the system</li> <li>- excessive pump output</li> <li>- the boiler output is not sufficiently rated for the particular heating system</li> <li>- low quality fuel (high moisture content, over sized logs)</li> <li>- ignition valve leaking</li> </ul>	<ul style="list-style-type: none"> <li>- refill</li> <li>- adjust the pump's switching and flow rate</li> <li>- design issue</li> <li>- use dry firewood and split logs into halves</li> <li>- repair</li> </ul>
<b>Boilers do not reach their required outputs and the pre-set water temperatures</b>	<ul style="list-style-type: none"> <li>- insufficient chimney draught</li> <li>- excessive chimney draught</li> <li>- Bent blades of draught ventilator (ignition too long or boiler operated with the ignition flap open)</li> <li>- <b>insufficiently cleaned boiler</b></li> <li>- combustion-air inlet to loading chamber is clogged</li> </ul>	<ul style="list-style-type: none"> <li>- new chimney; unsuitable connection</li> <li>- place a throttle valve (draught limiter) in the flue-gas duct</li> <li>- pull the draught regulator pulling rod out</li> <li>- straighten blades (to a 90° angle)</li> <li>- replace</li> <li>- <b>clean</b></li> <li>- clean</li> </ul>
<b>Doors leaking</b>	<ul style="list-style-type: none"> <li>- defective fibreglass cord</li> <li>- the nozzle becomes clogged</li> <li>- insufficient chimney draught</li> </ul>	<ul style="list-style-type: none"> <li>- replace</li> <li>- adjust the door hinges</li> <li>- do not burn small-particle wood, sawdust, bark</li> <li>- chimney defect</li> </ul>
<b>Ventilator does not turn</b>	<ul style="list-style-type: none"> <li>- boiler overheated – safety thermostat fuse out</li> <li>- rotating wheel clogged</li> <li>- defective capacitor</li> <li>- defective motor</li> <li>- bad contact in plug of motor cable lead</li> </ul>	<ul style="list-style-type: none"> <li>- press the thermostat push-button (using a pencil)</li> <li>- clean the ventilator including the ducting from tar and sediments</li> <li>- replace</li> <li>- replace</li> <li>- check - measure</li> </ul>

## 32. Spare parts

Heatproof shaped piece – nozzle	/5/
Heatproof shaped piece	/9/, /10/, /11/, /12/, /14/
Flue gas thermostat (code: S0031)	/27/
Switch with an indicator light (code: S0091)	/20/
Thermometer (code: S0041)	/18/
Control (boiler, operation) thermostat (code: S0021)	/24/
Safety thermostat (code: S0068)	/7/
Exhaust fan (Ventilator) (code: S0131)	/4/
Door sealing cord 18 x 18 (code: S0240)	/26/
Door filling - Sibral (code: S0261)	/25/
Condenser for exhaust fan UCJ4C52 - 1 $\mu$ F (code: S0171)	/30/

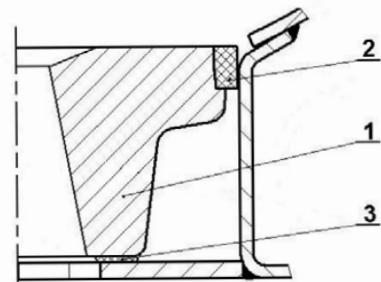


**CAUTION** – for boilers DC18GD and DC25GD use the exhaust fan UCJ4C52 with impeller Ø 150 mm; for boilers DC30GD and DC40GD use the exhaust fan UCJ4C52 with impeller Ø 175 mm, for boiler DC50GD use the exhaust fan UCJ4C52 with close impeller Ø175 mm.

### Heatproof shaped piece (nozzle) replacement

Material list: 1. Heatproof shaped piece  
2. sealing cord (3 pcs)  
3. boiler sealant (white)

**Procedure:** Remove or break up the old heatproof nozzle (further referred to as „nozzle“). Thoroughly clean the nozzle holder, which the nozzle was seated on, from tar and old sealant. Roll slim strands of boiler sealant. Place these continuously round the nozzle holder aperture in such a way which would prevent any penetration of secondary air underneath the nozzle later on. Take the new nozzle in your hand, stand in front of the boiler and position the nozzle in such a way that its recess (cut-out) is positioned in a direction away from you and downwards (the recess is positioned inside the boiler; a mark on the nozzle - if present – is positioned backwards). The secondary air is brought to the nozzle from the rear section of the boiler.



Place the nozzle on its holder and fully push towards the rear of boiler. Position it in such a way that free play between nozzle and holder is the same on both - the left and right side. Shape the sealing cords with a hammer so that their cross-section changes from square to trapezoid shape. Then spread them along the sides and front of the nozzle and by gently tapping calk them evenly round its circumference so that they are level with the nozzle. Cover the sealing cord connections with a small amount of the boiler sealant.

## Door sealing cord replacement

**Procedure:** Use a screwdriver to remove the old sealing cord and to clean the groove in which it was seated. Lightly shape the cord from a square into a trapeze cross-section using a hammer. Press the sealing cord along the door circumference (place the narrower base into the groove first) in such a way to ensure that the cord sticks well in the groove (if necessary use a little hammer). Position the lock's handle upwards, and with several gentle, careful taps of the door against the boiler, press the cord into the groove until the door can be closed smoothly. Fine-tune the position of the wheel that engages the lock's cam. This is the only procedure that can ensure good door seal!

## Adjusting the door hinges and locks

The loading door and ash-pan door are firmly connected to the boiler body by two sets of hinges. Each hinge consists of a nut, which is welded to the boiler body, and a screw to which the door is connected by means of a pin. If you want to adjust the hinge settings, first take off the upper hood (control panel) and remove both pins. Then remove the door and slightly turn the screw with a right-hand thread, as necessary. By following these steps in reverse order, you can replace the door. The door lock consists of a lever with a handle and a cam which engages a wheel that is screwed into the boiler and secured by a nut preventing its turning.

## 33. Environmental protection

The ATMOS gasifying boilers comply with the most demanding environmental requirements and were awarded the “Environmentally friendly product” mark, in compliance with directive No. 13/2002 of the Ministry of Environment of the Czech Republic. The boilers are certified in compliance with the European standard EN 303-5.

### Disposal of the boiler after expiration of its service life

It is necessary to provide an ENVIRONMENTALLY FRIENDLY DISPOSAL of the boiler's individual parts. Before disposal, clean all the flue cinder and place it in a refuse bin.  
Take the boiler body and hood to a scrap-metal collection site.  
Take all the ceramic (fireclay) parts to an approved refuse site



**NOTE** – In order to comply with the environmentally friendly operation requirements, it is prohibited to burn any other substances than specified for the boiler. Plastic bags, various plastic materials, paints, textiles, laminate are substances which should be particularly avoided but also avoid burning sawdust, sediment and coal dust.

# GUARANTEE CONDITIONS

Hot-water boiler

GB

1. If adhered to the product's use, operation and maintenance as described in the instruction manual, we guarantee that the product will maintain the characteristics as stipulated by the corresponding technical standards and terms for the duration of a guarantee period – of 24 months after the product's acquisition by the user, a maximum of 32 months after the manufacturer sells it to the sales representative. If the boiler is installed with Laddomat 21/22 or with a TV 60 °C thermoregulatory valve in combination with the accumulation tanks (see attached schematics), the guarantee period for the boiler body is extended from 24 to 36 months. The guarantee period for other parts remains unaffected.
2. If a defect not caused by the user, appears on the product during the guarantee period, the defect will be repaired free of charge.
3. The guarantee period is extended by the period of time for which has the product been under repair.
4. A claim to provide a guarantee period repair shall be made by the customer at the service company.
5. The guarantee claim is justified only in cases where the boiler installation was carried out by a person trained by the manufacturer and in compliance with valid standards and the instruction manual. A necessary condition for justifying a guarantee claim is possession of a legible and complete record identifying the company who installed the boiler. If the installation was not carried out in a professional manner, the subsequent costs are borne by the company that carried out the installation.
6. The purchaser was familiarised with the use and operation of the product – in a provable way.
7. A claim to provide an after-guarantee period repair shall be made by the customer at the service company, too. In this case, the customer bears the repair costs.
8. The user is obliged to adhere to instructions from the operation and maintenance manual. If the operation and maintenance manual is not adhered to, in cases of negligent or unprofessional handling, or burning prohibited substances, the guarantee expires and the repair costs are borne by the customer.
9. Boiler installation and operation must be in compliance with the instruction manual where the outgoing water temperature is in the 80 - 90 °C range and the temperature of water returning to boiler at least 65 °C in all its operation modes.
10. There is an obligation to have the boiler inspection carried out including its controls settings, structural elements and extraction system by an expert company at least once a year – confirmed in a warranty card

For boilers designated for the Czech Republic, Poland, Russia, Romania, Lithuania, Latvia and Hungary no guarantee conditions or insurance policies from outside these countries apply.



**Guarantee and post-guarantee period repairs are carried out by:**

- company representing ATMOS in the particular country for the particular region
- installation company that carried out the installation
- Jaroslav Cankař a syn ATMOS, Velenského 487, 294 21 Bělá pod Bezdězem,  
Czech Republic, Telephone. +420 326 701 404

# BOILER INSTALLATION PROTOCOL

## Installation carried out by:

Company: .....

GB

Street: ..... Town: .....

Telephone: ..... Country: .....

## Ascertained data:

### Chimney:

Dimensions: .....

### Flue-gas duct:

Diameter: .....

Height: .....

Length: .....

Chimney draught: ..... \*

Number of elbow pieces: .....

Date of last inspection: .....

Waste gas temperature: ..... \*

## Boiler connected with mixing valves and fittings (brief description of connection):

.....  
.....  
.....  
.....  
.....

### Fuel:

Type: .....

### Measured data:

Waste gas temperature: ..... °C

Size: .....

Emissions in stabilised state : CO .....

Moisture content: ..... \*

CO<sub>2</sub> .....

O<sub>2</sub> .....

Person responsible for the inspection: ..... Date: .....

Stamp : .....

Customer's signature: .....

*(Responsible person's signature)*

\* measured values

# RECORDS OF GUARANTEE PERIOD AND POST-GUARANTEE PERIOD REPAIRS

repair carried out by, date

..... repair carried out by, date

## ANNUAL INSPECTIONS RECORDS

Date	Date	Date	Date
stamp and signature	stamp and signature	stamp and signature	stamp and signature
Date	Date	Date	Date
stamp and signature	stamp and signature	stamp and signature	stamp and signature
Date	Date	Date	Date
stamp and signature	stamp and signature	stamp and signature	stamp and signature
Date	Date	Date	Date
stamp and signature	stamp and signature	stamp and signature	stamp and signature
Date	Date	Date	Date
stamp and signature	stamp and signature	stamp and signature	stamp and signature

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