Instruction manual

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Contents

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WE HOPE YOU WILL BE SATISFIED WITH OUR PRODUCT, AND WE RECOMMENED 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.47).

2. During the **gasification process, wood tar and condensates (acids)** form in the fuel stoking chamber. Therefore, there must be a Laddomat 22 or thermoregulatory valve installed behind the boiler in order to keep the **minimal temperature of water returning to the boiler at 65 °C**.

   Operating temperature of water in the boiler must be in the **80 - 90 °C** range.

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 operates environmentally-friendly at the nominal output level.

6. When operating the boiler in a **lower output mode** (summer operation or heating up warm service water), it is **necessary to fire-up daily**.

7. We therefore recommend installing the boiler with **accumulation tanks, which provides 20 - 30 % fuel consumption decrease, and longer service life of both – the boiler and the chimney and user-friendlier operation**.

8. If you cannot install the boiler into an accumulation system, then we recommend installing it at least with **one equalising 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 content – higher moisture content decreases the boiler’s performance and increases consumption**.

   Boilers with an extraction ventilator are marked with S at the end of the label.

CAUTION – if the boiler is installed with a Laddomat 22 or TV 60 °C (65/70/72/77 °C) thermoregulatory valve and with the accumulation tanks (see attached schematics), the guarantee period for the boiler drum is extended from 24 to 36 months. The guarantee period for other parts remains unaffected. In non-compliance with these instructions the drum’s and the heatproof pipes’ service life may dramatically decrease. The boiler drum may corrode in as little time as 2 years.

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

1. Intended use

The environmentally friendly boilers ATMOS DC32S and DC40SX are designed for heating family houses, cottages, holiday houses and other similar buildings. Boilers are suitable for buildings with heat loss ranging between 15 - 40 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 530 mm. 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 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 extracts the waste gas from the boiler or blows the air in the boiler.

exhaust fan - for DC32S, DC40SX

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 (nozzle) for passing of combustion products and gases. In the lower part of the boiler, there is a burnout space lined with ceramic shaped pieces. 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 of the boiler is equipped with the stoking door in the upper part and the ash pan door in the lower part. A device for automatic wood ignition (chamber with the ignition spiral) is built in between the two doors. 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.

In the upper part of the boilers there is a control panel with an electronic controller. 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.

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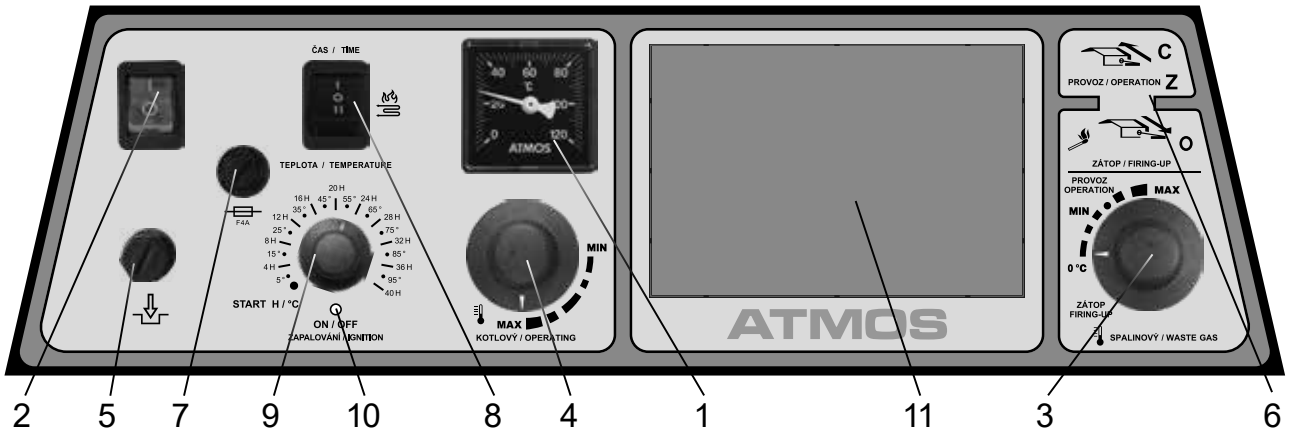
View of instrument plate for boilers with exhaust fan, ATMOS AC32 electronic controller for automatic wood ignition (AIW)

for boilers DC32S, DC40SX



1. Thermometer
2. Main switch
3. Waste gas thermostat
4. Control thermostat (operating boiler)
5. Safety irreversible thermostat
6. Ignition valve pulling rod control
7. Fuse T4A/1500 - type A
8. Automatic wood ignition switch I-0-II (time-0-accumulation tank temperature)
9. Knob - AC32 electronic controller for automatic wood ignition (AIW)
10. AIW status indicator
11. Area for electronic regulation of the heating system (92x138 mm)

Description:

1. **Thermometer** - monitors the temperature of water exiting the boiler.

2. **Main switch** - allows for completely shutting down boiler if necessary.

3. **Waste gas thermostat** - is used to switch off the fan (ventilator) when the fuel has burnt out.

CAUTION – when firing up (igniting), set the waste gas thermostat to (“0 °C“- firing-up). After flaring up, set the waste gas thermostat to „operation“. It is necessary to detect the optimal operating position. Should the waste 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 waste gas thermostat (set to “0 °C“ - firing-up).

4. **Control thermostat (boiler operation thermostat)** – controls the boiler operation depending on the temperature of water exiting the boiler.

5. **Safety irreversible thermostat** – serves as boiler protection against overheating in case of control thermostat failure or as an indication of exceeding the emergency temperature. **If such exceeding occurs, it is then necessary to depress the thermostat.**

6. **Ignition valve pulling rod** – serves for opening the ignition valve during heating or inserting fuel.

ATTENTION - During normal operation of the boiler and when the automatic wood ignition function is switched on, the pulling rod of the ignition valve must always be retracted (the valve is closed)!

7. Fuse - T4A/1500 - type A - ATMOS AC32 controller protection

8. **Switch - automatic wood ignition - I-0-II** - the switch is used to turn on (select) the automatic wood ignition function. The switch allows you to select between automatic wood ignition according to the set time **I** (delay - time to firing up) and automatic wood ignition according to the temperature in the upper part of the accumulation tank **II**.
   When the switch is set to 0, the function is switched off.

9. **AC32 electronic controller** - the use of the rotary knob allows you to set the time (delay) or temperature of the accumulation tank at which the automatic wood ignition (AIW) will occur.
   Function:
   - setting according to the time delay - range: 0 - 40 hours
   - setting according to the temperature in the upper part of the accumulation tank - range: 0 °C - 95 °C
   - switching according to the signal from the remote device (room thermostat, GSM, Wi-Fi)

10. **Signalling indicator (LED) -** is used to signal the state of automatic wood ignition or for error messages.

11. Area for electronic regulation of the heating system can be used to house any type of regulation system that fits into an aperture of (92 x 138 mm), for example ATMOS ACD 03. The electric harness is prefabricated and ready to be used for the regulation's power supply.

Advantages of boilers

Boilers provide burning at high temperatures with the generator gasification function. That results in fuel saving and ecological 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. Boilers marked with GS provide this process in the ceramic combustion area with primary air side inlets. Boilers equipped with exhaust fan (extraction ventilator) require simple and easy operation, and are marked with "S". Large fuel hopper allows burning of the log pieces with the maximum length 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.

3. Technical data

Boiler type ATMOS		DC32S	DC40SX
Boiler heat output	kW	35	40
Boiler thermal input		39,4	45,0
Heat-up area	m^2	2,9	2,9
Fuel duct volume	dm^3 (l)	135	135
Feeding inlet dimensions	mm	450x260	450x260
Specified chimney draught	Pa / mbar	24 / 0,24	25 / 0,25
Maximal water overpressure	kPa / bar	250 / 2,5	250 / 2,5
Boiler weight	kg	366/400	368
Flue gas-outlet pipe diameter	mm	150/152	150/152
Boiler height	mm	1260	1260
Boiler width	mm	678	678
Boiler depth	mm	1060	1060
El. parts ingress protection	IP	20	
Electrical power input (auxiliary)	W	50	50
Electric input (with ignition on)	W	550	550
Electrical input in standby mode	W	3	3
Ignition mode		manual / automatic	
Boiler effectiveness	%	88,9	88,9
Boiler class		5/4	5
Boiler category		1	
Operating mode		non-condensing	
Energy efficiency class		A+	A+
Waste gas temperature at nominal output	°C	185	185
Waste gas combustion products flow weight at nominal output	kg/s	0,020	0,022
Max. noise level - according to EN15036-1	dB	65	65
Specified fuel (preffered)		Dry wood (log) with heating capacity 15 - 17 $MJ.kg^{-1}$, water content at least 12 % - max. 20 %, average 80 - 150 mm	
Average fuel consumption	$kg.h^{-1}$	9,2	10,2
Per heating season		1 kW = 1 spatial cubic meter	
Wood length	mm	530	530
Burning time at nominal output	hod.	3	2
Boiler water volume	l	80	80
Hydraulic pressure drop	mbar	0,20	0,20
Buffer tank minimum volume	l	500	500
Connecting voltage	V/Hz	230/50	
Specified minimum temperature of water returning to boiler is 65 °C when in operation. **Specified boiler operating temperature is 80 - 90 °C.**			

Boiler drawings key

1. Boiler drum
2. Stoking door - upper
3. Ash-pan door - bottom
4. Ventilator - exhaust fan (S)
5. Heatproof shaped piece - nozzle
6. Control panel
7. Regulating flap
8. Ceramics - roof
9. Nozzle sealing - 12x12 (14x14)
10. Ignition valve
11. Cleaning lid
12. Ignition valve pulling rod
13. Frame shield
14. Draught regulator - Honeywell FR 124
15. Cooling loop protecting against overheating
16. Door filling - Sibral
17. Ventilator control thermostat (boiler)
18. Thermometer
19. Switch with an indicator light
20. Main switch I-O-II
21. T4A/1500 fuse - type A
22. Waste gas thermostat
23. Safety thermostat (**Caution** – in overheat condition must be depressed)
24. AC32 electronic controller
25. Door sealing – cord 18x18
26. Capacitator for exhaust fan
27. Flue gas brake for rear flue way duct (DC40SX)
28. Waste gas brake - under the roof (DC40SX)
29. Primary air regulation
30. Secondary air regulation

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 typ	DC32S	DC40SX
A	1260	1260
B	1060	1060
C	678	678
D	950	950
E	150/152	150/152
F	69	69
G	185	185
H	1008	1008
CH	256	256
I	256	256
J	6/4”	6/4”

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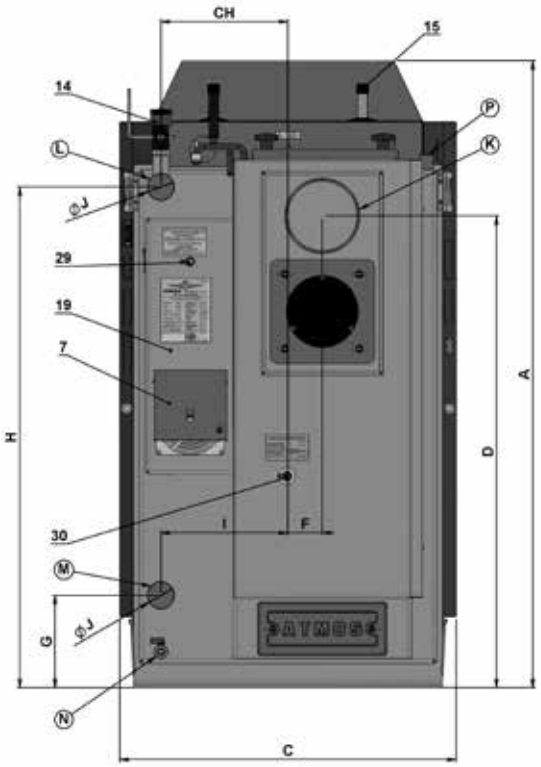
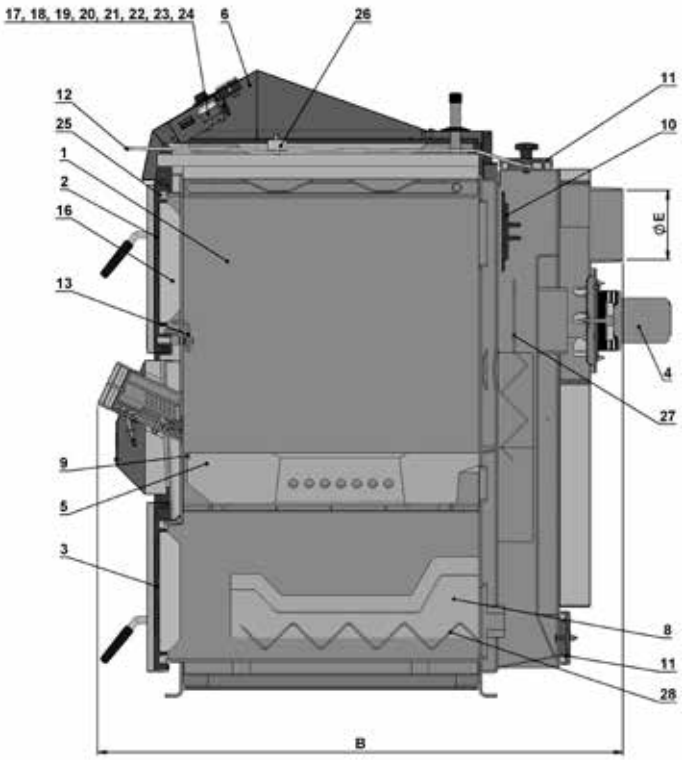
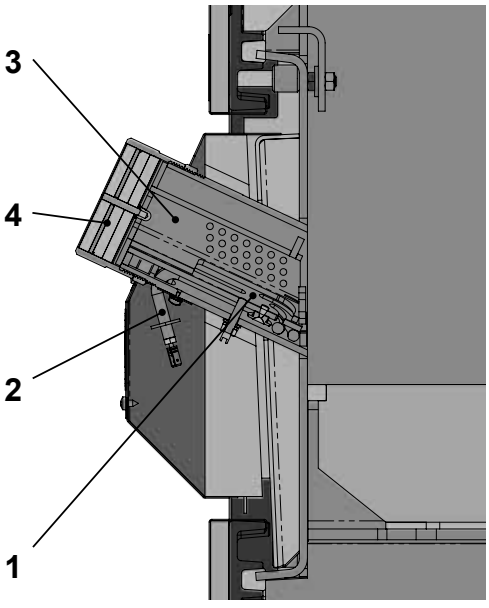
Drawings of boilers

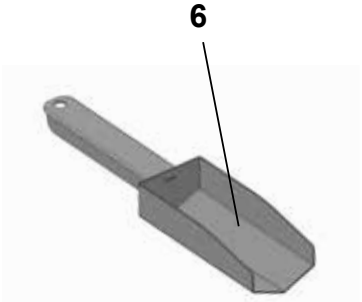




Drawing of the ignition device

1. Ignition spiral plate
2. Ignition spiral
3. Removable ignition chamber
4. Screw lid (always tightened during operation)
5. Removable blanking chamber
6. Pellet filling scoop



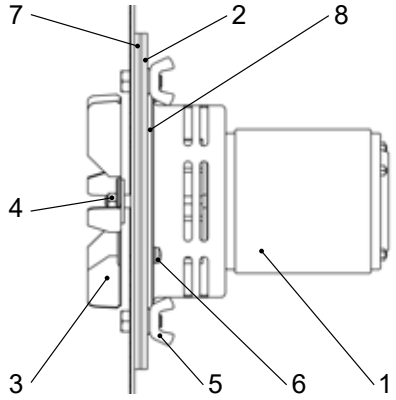


INFO - The screw lid must always be properly tightened during operation.
The blanking chamber /5/ must be inserted into the boiler instead of the ignition chamber /3/, whenever we do not use automatic wood ignition. This protects the ignition spiral and the ignition chamber against unnecessary wear (the service life is extended).

Exhaust fan schematics

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

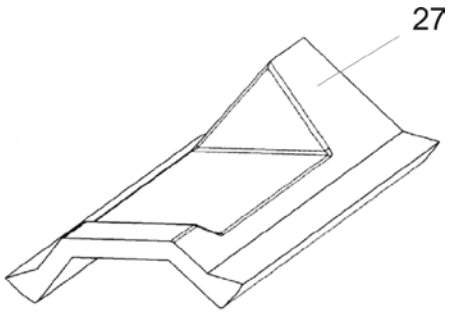
1 - Motor
2 - Plate
3 - Rotating wheel (stainless steel)
4 - **Nut with left-handed thread** and washer
5 - Wing nut
6 - Screw
7 - Large gasket (2 pcs)
8 - Small gasket



4. Type and seating of shaped pieces into combustion area

1. For type

DC32S
DC40SX



27. Heatproof shaped piece - roof is for:

- for boiler (DC32S, DC40SX) lenght 500 mm

INFO - Roof of the lower combustion area must always be fully pressed against the boiler rear wall.

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
Removable blanking chamber and pellet filling scoop (with pocket)	1 pc

6. Fuel

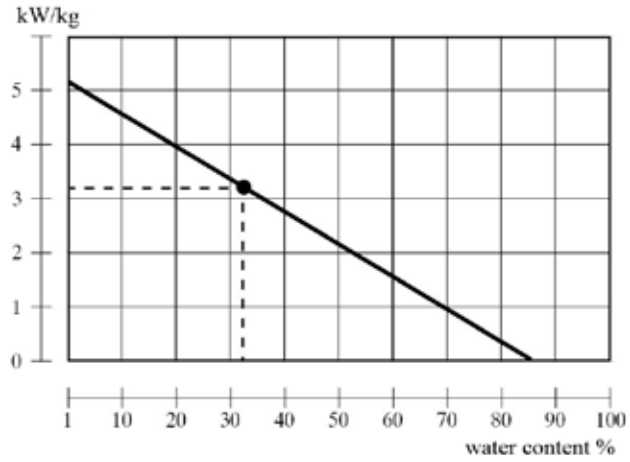
Specified fuel is dry chopped log fire wood, Ø 80 - 150 mm, at least two years old, moisture 12 % to 20 %, caloric power 15 – 17 MJ.kg-1 and log length 530 mm. Fuel dimensions are stated in section 3 „Technical Data“. It is also possible to burn large pieces of wood waste in combination (max. 10 %) with crude logs. The fuel must comply with requirements set out in EN ISO 17225. The fuel storage facility must comply with requirements set out in EN ISO 20023.

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 32 S	-	24
DC 40 SX	-	31

The information is relevant to other gasification boiler types.

CAUTION - Boilers are not suitable for burning wood with moisture content lower than 12 %.

Fuel heating capacity

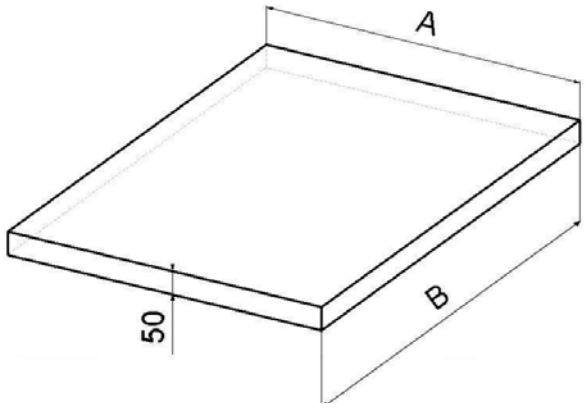
Wood - type	Heating capacity per 1 kg		
	kcal	kJoule	kWh
spruce	3900	16250	4,5
pine	3800	15800	4,4
birch	3750	15500	4,3
oak	3600	15100	4,2
beech	3450	14400	4,0

INFO - 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

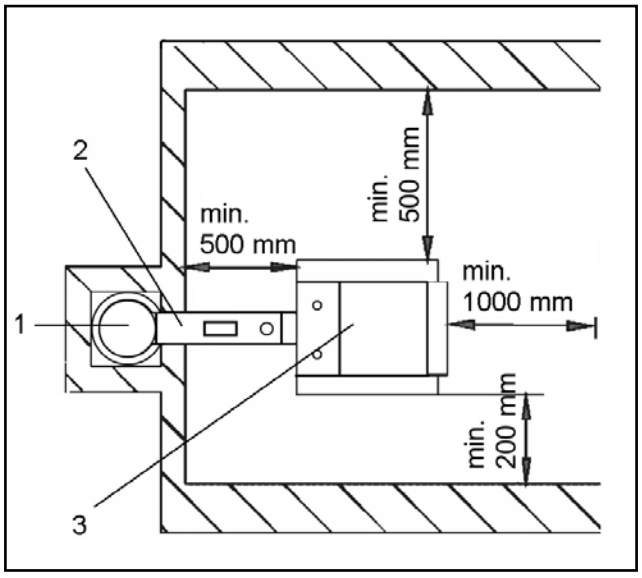
Boiler type (mm)	A	B
DC32S, DC40SX	700	800

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. lacing boilers in living areas (including halls) is not permitted. The combustion air inlet aperture in the boiler room must be of minimum 300 cm^2 for boilers of 15 - 75 kW outputs.



1 - Chimney
2 - Flue duct
3 - Boiler

CAUTION - No other devices may be installed in the boiler room if they could create vacuum at the boiler installation site.
Maximum permissible vacuum in the boiler room (boiler installation site) is 0 Pa.

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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 14). 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.

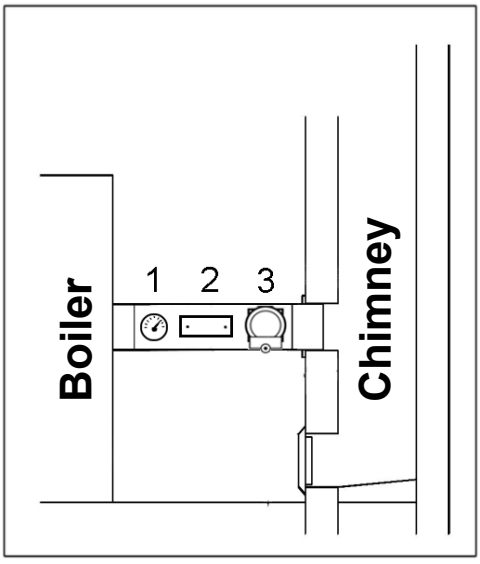
Indicative values of the chimney cross section dimensions:

20 x 20 cm	height 7 m
Ø 20 cm	height 8 m
15 x 15cm	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 1 m**, 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)

INFO - In case of excessive chimney draught, install draught regulator (limiter) /3/ or a throttle valve.

11. Fire prevention during installation and use of heating appliances

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

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, fibreglass 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

CAUTION - 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).**

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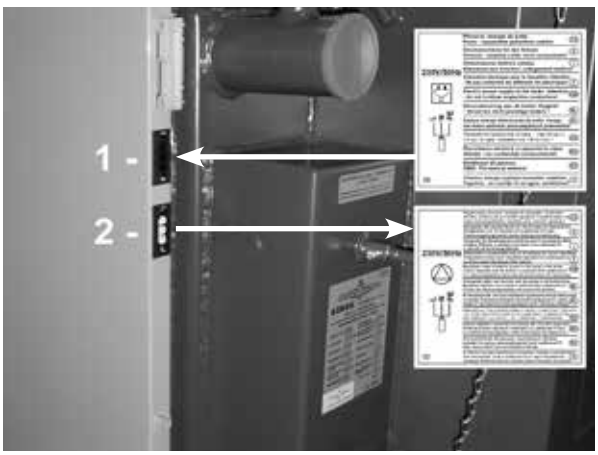
12. Connecting boilers to the electrical power network

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.

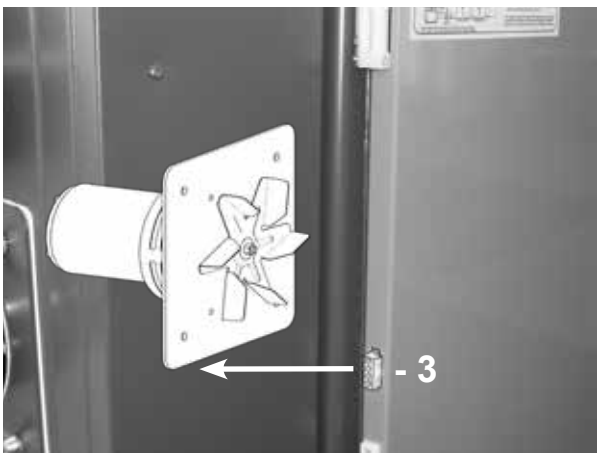
CAUTION - The mains cable must not be equipped with a plug (designed to be connected to a socket). It must be connected in a fixed way to a switchboard or junction box to avoid confusion of the conductors.

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:

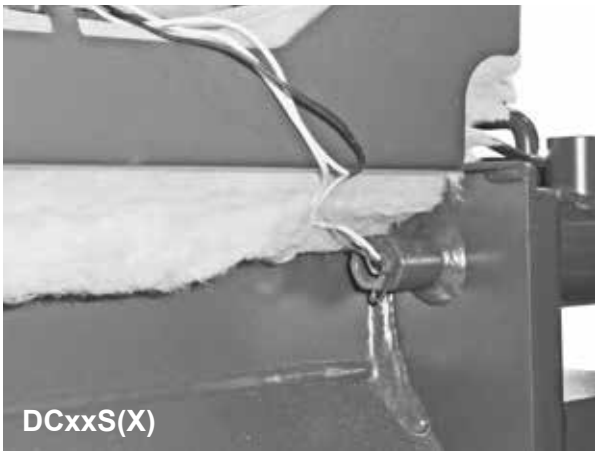


Connector in the right side hood

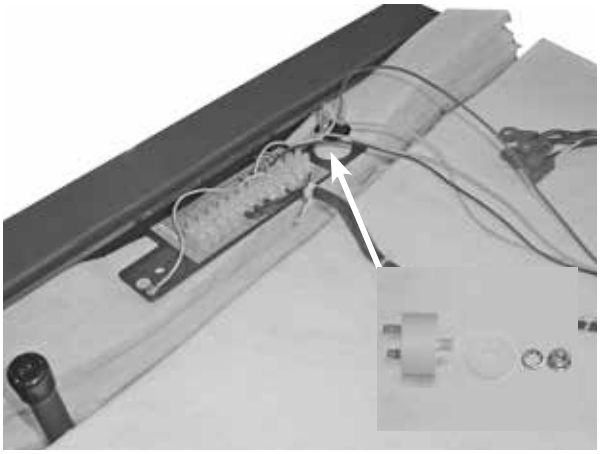


Connector in the left side hood

1 - connector for income cabel (L - brown, N - blue, PE - green/yellow)
2 - connector for pump in boiler circuit - white (L - brown, N - blue, PE - green/yellow)
3 - connector for exhaust fan



Pocket for thermostats (sensors)



Capacitator for exhaust fan
UCJ4C52 - 1µF

13. Electrical wiring diagram for boilers DC32S and DC40SX with AC32 controller and the ignition device

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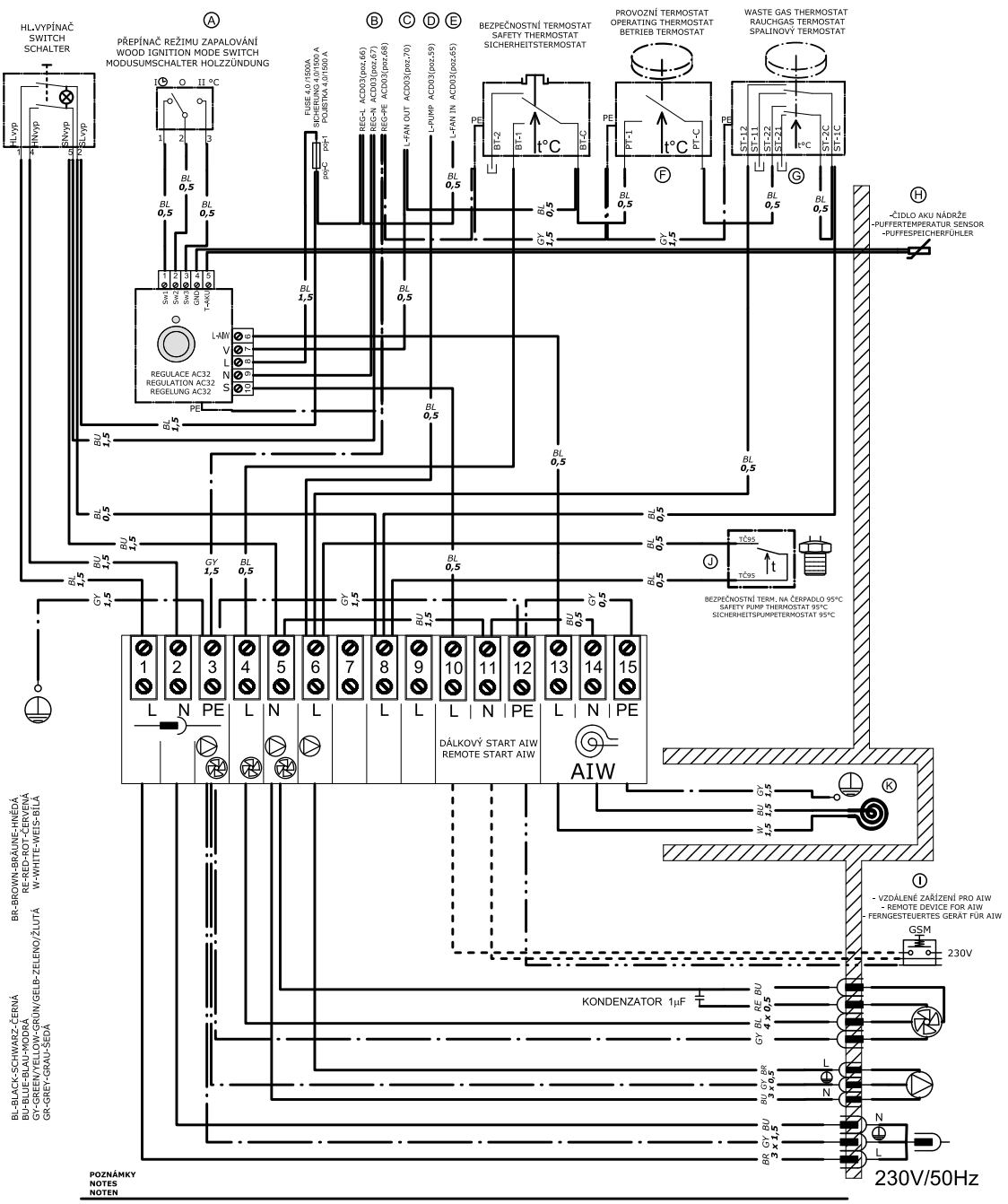


(A) PŘEPÍNAČ REŽIMU ZAPÁLENÍ DŘEVA (I = ČAS / 0 = VYP / II = TEPLOTA) - AC32 (poz.1,2,3)
WOOD IGNITION MODE SWITCH (I = TIME / 0 = OFF / II = TEMPERATURE) - AC32 (pos.1, 2, 3)
MODUSUMSCHALTER BEI HOLZZÜNDUNG (I = ZEIT / 0 = AUS / II = TEMPERATUR) - AC32 (poz.1,2,3)

(B) NAPÁJECÍ SVORKY "REG L,N,PE" PRO ELEKTRONICKOU REGULACI ACD03, AC32 (poz.L,N,PE)
RESERVOIR POINTS "REG L,N,PE" FOR ELECTRONIC REGULATION ACD03, AC32 (pos.L,N,PE)
ANSCHLUSSKLEMMEN "REG L,N,PE" FÜR ELEKTRONISCHE REGELUNG ACD03, AC32 (poz.L,N,PE)

(C) PŘÍPOJOVACÍ SVORKA "L - FAN OUT" KOTLOVÉHO VENTILÁTORU DO ELEKTRONICKÉ REGULACE ACD03, AC32 (poz.V)
RESERVOIR POINT "L - FAN OUT" OF BOILER FAN TO THE ELECTRONIC REGULATION ACD03, AC32 (pos.V)
ANSCHLUSSKLEMME "L - FAN OUT" DER KESSELGEBLÄSE FÜR DIE ELEKTRONISCHE REGELUNG ACD03, AC32 (poz.V)

(D) PŘÍPOJOVACÍ SVORKA "L-PUMP" KOTLOVÉHO ČERPADLA DO ELEKTRONICKÉ REGULACE ACD03
RESERVOIR POINT "L-PUMP" OF BOILERPUMP TO THE ELECTRONIC REGULATION ACD03
ANSCHLUSSKLEMME "L-PUMP" DER KESSELPUMPE FÜR DIE ELEKTRONISCHE REGELUNG ACD03

(E) PŘÍPOJOVACÍ SVORKA "L - FAN IN" KOTLOVÉHO VENTILÁTORU DO ELEKTRONICKÉ REGULACE ACD03
RESERVOIR POINT "L - FAN IN" OF BOILER FAN TO THE ELECTRONIC REGULATION ACD03
ANSCHLUSSKLEMME "L - FAN IN" DER KESSELGEBLÄSE FÜR DIE ELEKTRONISCHE REGELUNG ACD03

(F) KONEKTORY "PT-C" A "PT-1" ODPOJIT PŘI OVLÁDÁNÍ KOTLOVÉHO VENTILÁTORU ELEKTRONICKOU REGULACÍ
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 KESSELGÄBLESEBEDIENUNG DER ELEKTRONISCHE REGELUNG

(G) PŘI OVLÁDÁNÍ KOTLOVÉHO VENTILÁTORU A ČERPADLA KOTLE ELEKTRONICKOU REGULACÍ ACD03 ODPOJIT KONEKTORY SPALINOVÉHO TERMOSTATU
WHEN ELECTRONIC REGULATION ACD03 CONTROL BOILER FAN AND PUMP - WATEGAS THERMOSTAT´S CONNECTORS MUST BE UNCONNECT
DEN RAUCHGAS THERMOSTAT KONNEKTOREN ABKLEMMEN BEI DER KESSELGÄBLESE UND PUMPE BEDIENUNG DER ELEKTRONISCHE REGELUNG ACD03

(H) ČIDLO TEPLOTY AKUMULAČNÍ NÁDRŽE PRO SEPNUTÍ AUTOMATICKÉHO ZAPALOVÁNÍ DŘEVA DLE TEPLOTY AKUMULAČNÍ NÁDRŽE - AC32 (poz.TV,GND)
ACCUMULATION TANK TEMPERATURE SENSOR FOR SWITCHING ON THE AUTOMATIC WOOD IGNITION ACCORDING TO ACCUMULATION TANK TEMPERATURE - AC32 (pos. TV, GND)
PUFFESPEICHERFÜHLER FÜR AUTOMATISCHES HOLZZÜNDUNGSCHALTEN NACH PUFFERSPEICHERTEMPERATUR - AC32 (poz.TV,GND)

(I) DÁLKOVÉ OVLÁDÁNÍ (např. GSM) PRO OKAMŽITÝ START AUTOMATICKÉHO ZAPALOVÁNÍ DŘEVA (230V/50Hz) - AC32 (poz.S)
REMOTE CONTROL (eg GSM) FOR IMMEDIATE START OF THE AUTOMATIC WOOD IGNITION (230 V/50 Hz) - AC32 (pos. S)
FERNBEDIENUNG (zB.GSM) ZUM SOFORTIGEM START DER AUTOMATISCHEN HOLZZÜNDUNG (230V/50Hz) - AC32 (poz. S)

(J) KONEKTORY "TČ95" ODPOJIT PŘI OVLÁDÁNÍ ČERPADLA KOTLE ELEKTRONICKOU REGULACÍ
WHEN ELECTRONIC REGULATION CONTROL BOILER PUMP - CONNECTORS "TČ95" MUST BE UNCONNECT
DEN KONNEKTOREN "TČ95" ABKLEMMEN BEI DER KESSELPUMPEBEDIENUNG DER ELEKTRONIC REGELUNG

(K) ŽHAVÍCÍ TĚLÍSKO AUTOMATICKÉHO ZAPALOVÁNÍ DŘEVA
HEATING ELEMENT OF AUTOMATIC IGNITION OF WOOD
GLÜHSPIRALE FÜR AUTOMATISCHE HOLZANZÜNDUNG

14. Obligatory ČSN EN standards dealing with boiler designing and boiler assembly

ČSN EN 303-5	- Heating boilers for solid fuels, hand or automatically stocked, nominal heat output of up to 500 kW - Terminology, requirements, testing and marking
ČSN 06 0310	- Heating systems in buildings – Design and installation
ČSN 06 0830	- Heating systems in buildings – Safety devices
ČSN 73 4201	- Chimneys and connecting flue pipes – Design, construction and installation of heating appliances
ČSN EN 1443	- Chimneys - General requirements
ČSN 06 1008	- Fire protection of heating appliances
ČSN EN 13501-1	- Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests
ČSN EN 1264-1	- Water based surface embedded heating and cooling systems – Definitions and symbols
ČSN EN 1264-2	- Water based surface embedded heating and cooling systems - Part 2: Floor heating: Prove methods for the determination of the thermal output using calculation and test methods
ČSN EN 1264-3	- Water based surface embedded heating and cooling systems - Part 3: Dimensioning
ČSN EN 442-2	- Radiators and convectors - Test methods and rating
ČSN EN ISO 17225-2	- Solid biofuels – Fuel specifications and classes - Part 2: Graded wood pellets
ČSN EN ISO 17225-5	- Solid biofuels – Fuel specifications and classes - Part 5: Graded firewood
ČSN EN ISO 20023	- Solid biofuels – Safety of solid biofuel pellets – Safe handling and storage of wood pellets in residential and other small-scale applications
EU 2015/1189	- COMMISSION REGULATION implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for solid fuel boilers

Standards for evaluation of conformity and other technical standards:
ČSN EN ISO 12100:2011, ČSN EN ISO 14120:2017, ČSN ISO 1819:1993, ČSN EN ISO 13857:2022, ČSN EN ISO 11202:2010, ČSN EN ISO 3746:2011, ČSN EN 15036-1:2007

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 waste gas thermostat built in the boiler (during fire-up), if the boiler is connected with the accumulation tanks and if the gravity water circulation which prolongs the required temperature build up functions well in the boiler circle. To connect the pump in the boiler circuit, use the prepared connector in the side boiler hood (light grey). For greater safety, a 95 °C pump safety thermostat is built into the boiler from the factory (see electrical 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 waste 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, can be use a open expansion vessel. However a close expansion vessel 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:

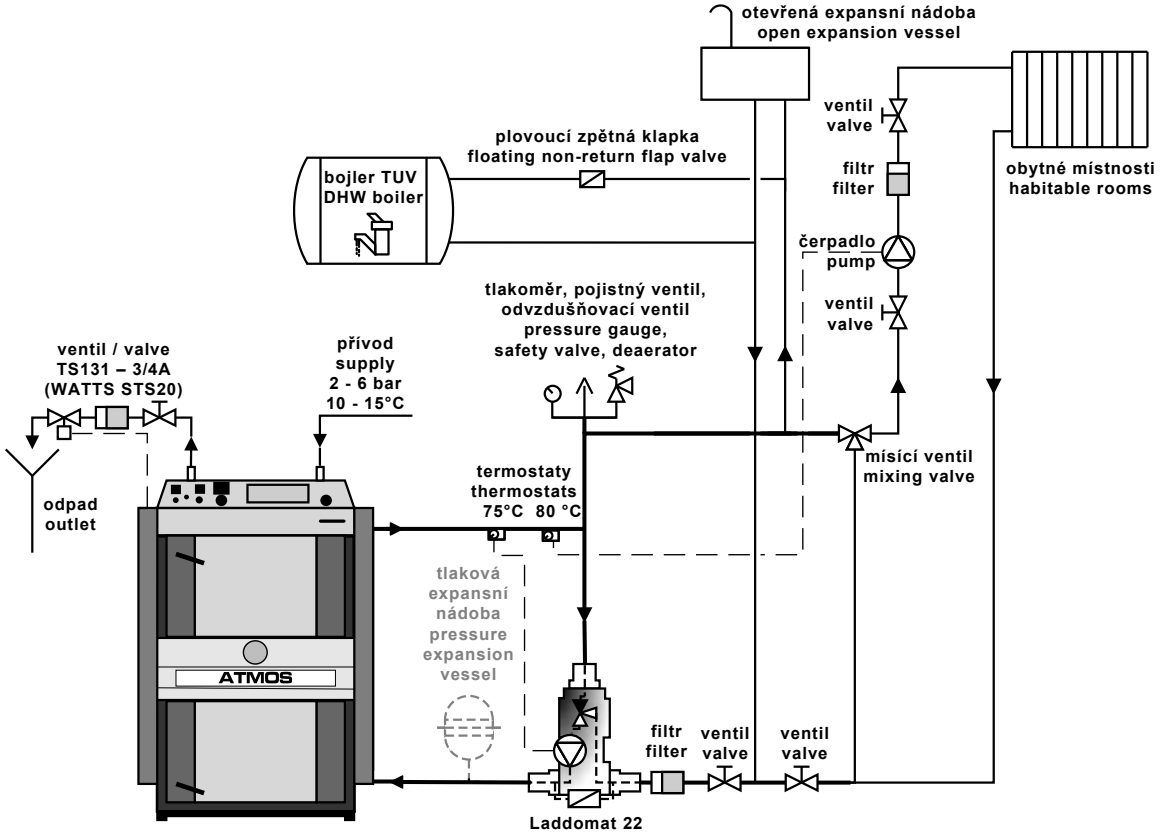
ATMOS ACD 03 / 04 - Equithermal controller set for solid fuel boilers

16. Boiler corrosion protection

The specified solution is connecting the boiler with **Laddomat 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**. Another variant is connection of the boiler with a three-way mixing valve with an actuator controlled from the electronic controler (e.g., ATMOS ACD 03 (ACD 04)) to keep minimum temperature of the water returning to the boiler (65 - 75 °C).

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 (waste gas) temperature must not drop **below 110 °C** during normal operation. Low waste 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.

17. Recommended boiler connection with Laddomat 22



ATTENTION - When connecting the boiler without the accumulation tank, we do not use the temperature sensor of the accumulation tank (TV), which is located at the back of the boiler. For automatic wood ignition, we can use only the function of automatic wood ignition according to the set delay time (time to firing up) or the function of remote switching by a remote device (room thermostat, GSM, Wi-Fi).

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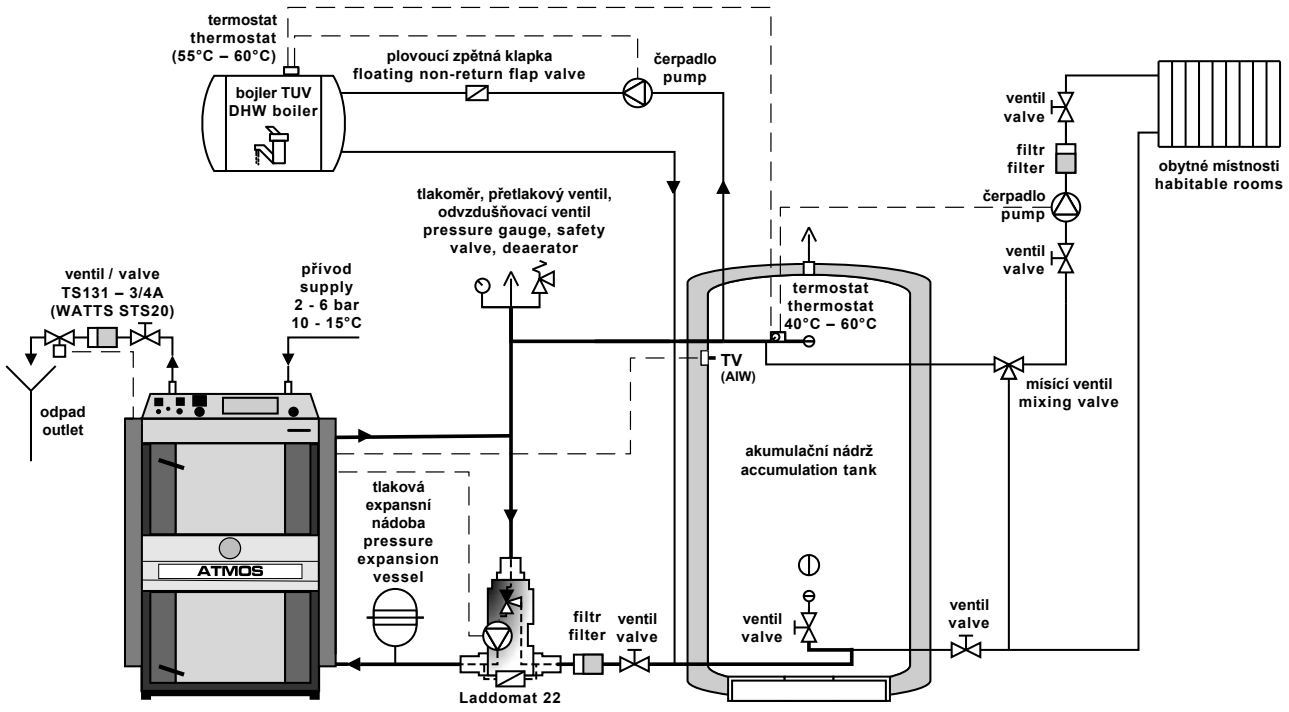
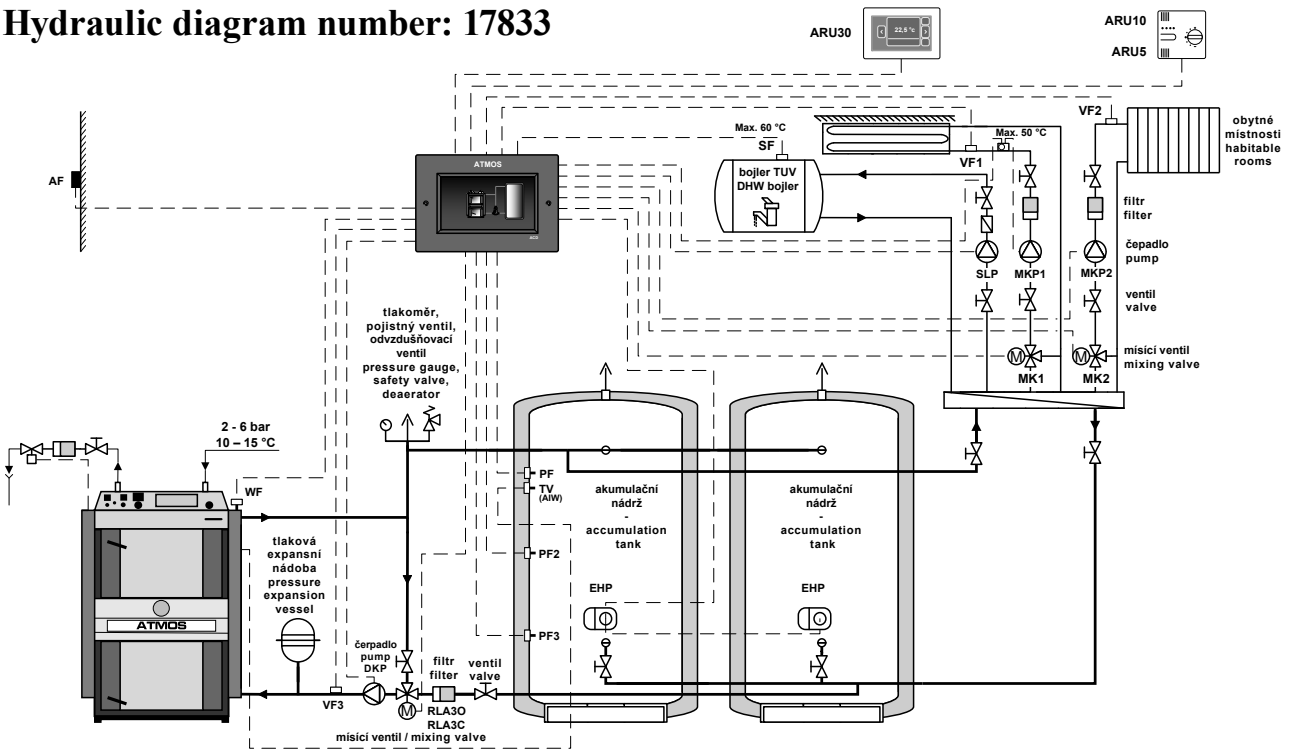
18. Boiler connection with Laddomat 22 and accumulation tanks



19. Boiler connection with 3-way valve with actuator, accumulation tanks and equithermal controller ATMOS ACD 03

Hydraulic diagram number: 17833



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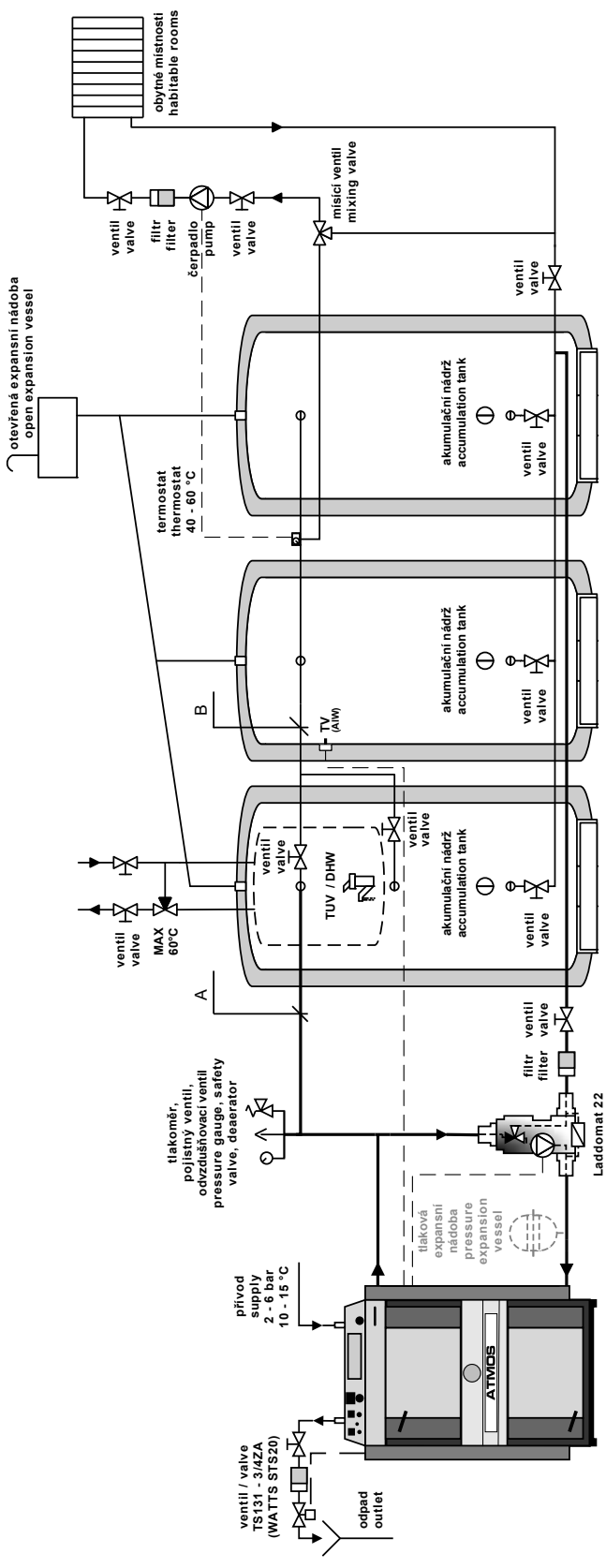
20. Recommended boiler connection with Laddomat 22 and accumulation tanks

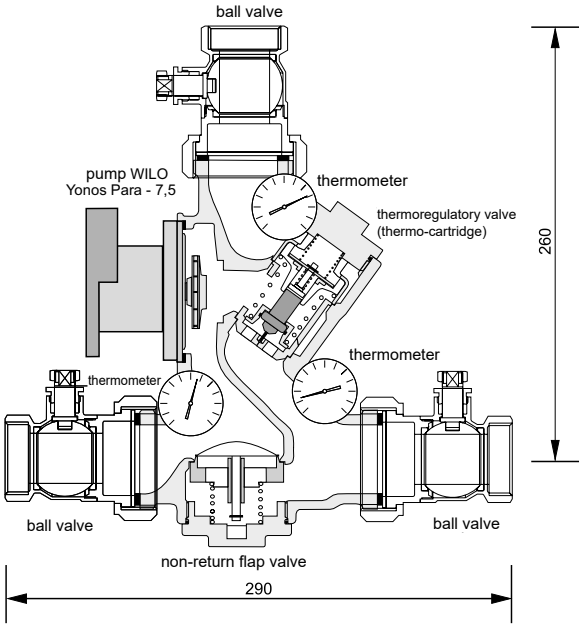


When connecting the boiler with Laddomat 22 and accumulation tanks, we recommend to switch the Laddomat 22 pump with an flue-gas thermostat build in the boiler, seesection 17, page 19.

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”)

21. Laddomat 22

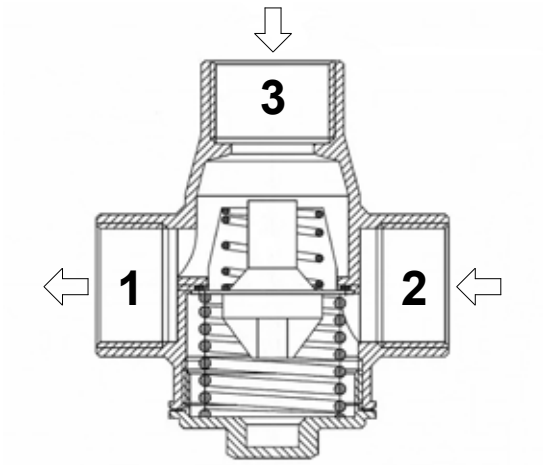


With its construction, Laddomat 22 replaces the traditional connection composed of individual parts. It is composed of a cast-iron body, thermoregulatory valve, pump, non-return flap valve, ball valves and thermometers. When the water temperature reaches 78 °C, the thermoregulatory valve opens the water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

OPERATION DATA	
Max. operating pressure	0,25 MPa / 2,5 bar
Design pressure	0,25 MPa / 2,5 bar
Test over pressure	0,33 MPa / 3,3 bar
Highest operating temperature	100 °C

WARNING - 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.

22. Thermoregulatory valve



Thermoregulatory valve type, TV 60 °C (65/70/72/77 °C) is used with solid fuel boilers. When the boiler water temperature reaches + 60 °C (65 °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 °C (65/70/72/77 °C)

For boilers:

DC32S, DC40SX..... DN32

23. 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 (kW)	15 - 25	25 - 30	**30 - 50**	50 - 150
Volume (l)	1000 - 1500	1500 - 2000	**2000 - 3000**	3000 - 6000

The standard ATMOS accumulation tanks provided

TANK TYPE	VOLUME (l)	DIAMETER (mm)	HEIGHT (mm)
AN 500	500	600	1970
AN 600	600	750	1611
AN 750	750	750/790*	2010/1750*
AN 800	800	790*	1910*
AN 1000	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).

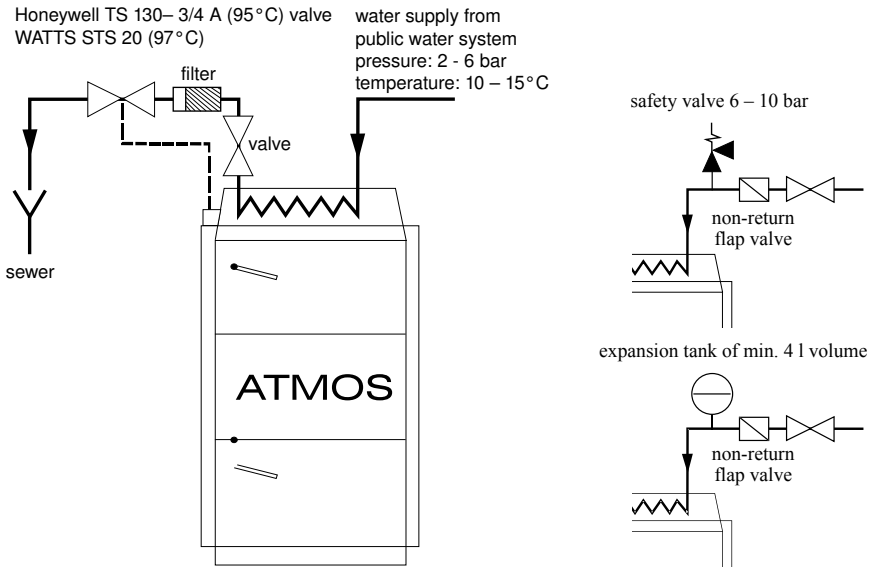
Advantages

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 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

24. 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.

25. 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.

INFO - Boilers with automatic fuel ignition enable both classic manual ignition and automatic planned ignition of wood using the integrated ignition device (ignition chamber and ignition spiral).

Manual ignition and operation

Before the manual fuel ignition open the ignition valve /13/ by pulling the ignition valve pulling rod /17/. Through the top door /2/ insert dry wood kindling onto the heatproof moulded brick /5/ perpendicularly to the channel so that a 2 - 4 cm gap between the fuel and channel is created to allow passage of flue gas. Place paper or wood wool on top of the kindling, then another layer of kindling and a larger amount of dry wood.

After ignition close the top door and open the lower door. Set the flue gas thermostat for the ignition (to minimum - 0 °C) by this you switch the exhaust fan on. Leave the I-0-II toggle switch in position 0.

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/. 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 boiler 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.

Automatic ignition and operation

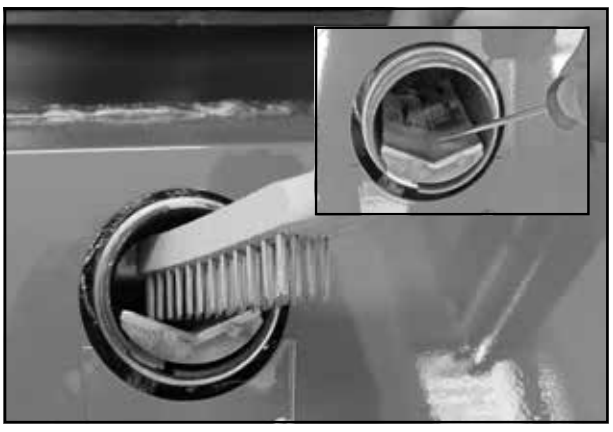
Before automatic ignition of wood scheduling, first prepare the boiler for operation.

Thoroughly clean the boiler stoking chamber through the upper door. It is important to remove ashes or dirt deposits that would prevent the wood from igniting properly.

INFO - At the same time, check or clean other parts of the boiler, flue gas duct and chimney, see other chapters of this manual (page 42, 26. Boiler cleaning).

Remove the screw lid of the ignition device. Remove the ignition or blanking chamber and clean the space above the ignition spiral plate properly.

Example of removing the ignition or blanking chamber



Example of cleaning the space above the ignition spiral plate

Insert the ignition chamber into the boiler and insert (fill in) ignition pellets into it.

The amount of pellets corresponds to the size of the scoop, which is part of the boiler delivery. Tighten the screw lid properly.

Example of inserting the ignition chamber into the boiler

Example of inserting ignition pellets into the ignition chamber

Pellets for ignition in the automatic ignition chamber

Screwing in and tightening the automatic ignition lid

CAUTION - For ignition device we use only high-quality pellets of Ø 6 - 8 mm and the length of 10 - 5 mm and the calorific value of 16 - 19 MJ/kg^{-1}.

We load fuel (wood) and firing material (newsprint) into the stocking chamber.

First insert small kindling chips into the stoking chamber perpendicularly to the gasifying nozzle opening. Leave a gap of 1 to 2 cm between the kindling chips. Insert two logs on each side of the stoking chamber on the kindling chips. Two logs on the left side and two on the right side.

Insertion of the kindling chips perpendicularly to the gasification nozzle opening

Insertion of four larger logs on both sides of the chamber (2 + 2 logs)

Place crumpled newsprint paper in between the logs. Insert the crumpled paper starting from the back, until you fill the space under the door frame. Finally, insert the last piece of newsprint paper so that it is in contact with the ignition chamber, in which the pellets are inserted. Never press the newspaper against the ignition chamber with the pellets.

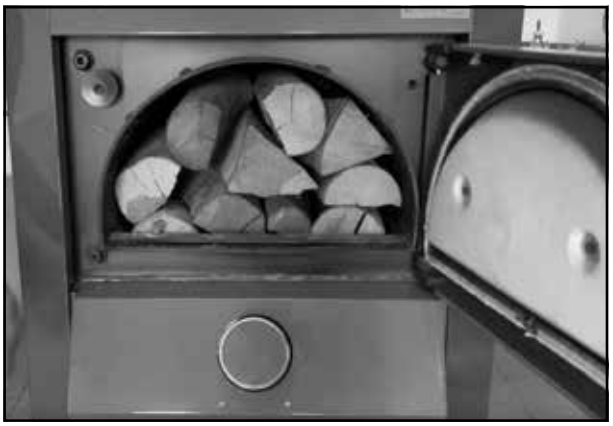
Insert small kindling chips on the newspaper in the same way as the first layer was laid, i.e. (across the logs with the paper).

Filling the space between the logs with newsprint paper

Inserting kindling chips across the chamber above newsprint paper

Finally, fill the whole chamber with log fire wood.

CAUTION - Insert the wood into the chamber loosely and ideally with the bark upwards.



Example of filling the stoking chamber

Detail of a properly filled chamber

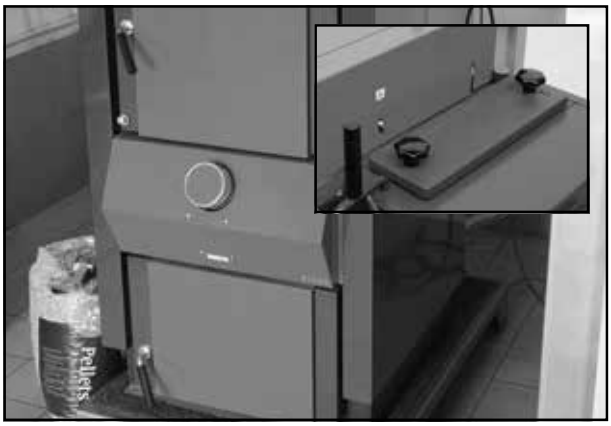
Before starting the automatic wood ignition itself:

Close the ignition valve and set the FR124 draught regulator, which controls the control valve for the combustion air supply to the boiler to the operating position (80 – 90 °C), see page 38.

Closed ignition valve - retracted pulling rod

Open (set) valve for combustion air supply to the boiler (set on 80 - 90 °C)

We will check the proper closure of all cleaning holes, the lids on the flue gas channel and the door on the boiler. We properly tighten the securing screw of the upper loading door.



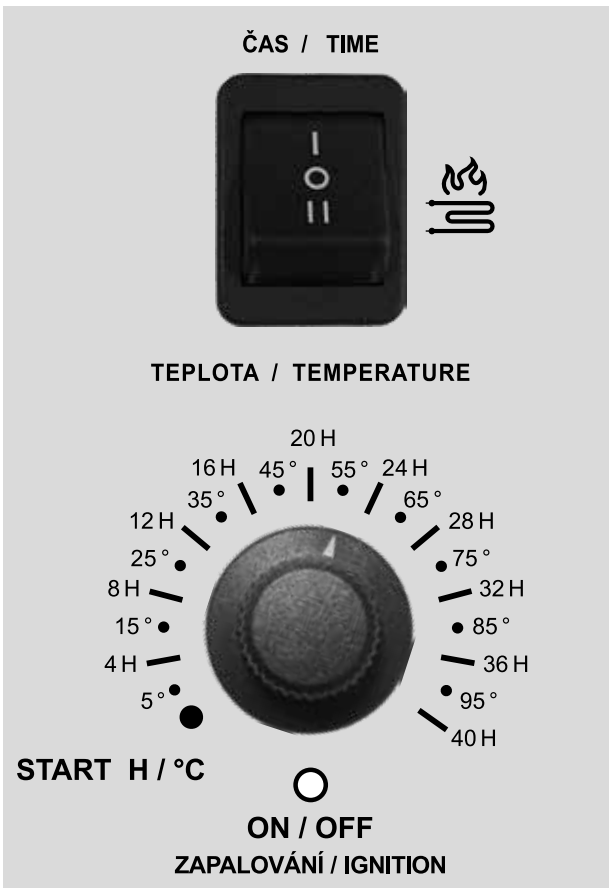
All doors and cleaning apertures closed

Tightened locking screw of the stoking door

Setting and starting the automatic wood ignition

- ATMOS AC32 Controller

The ATMOS AC32 electronic controller is designed for a simple setting and control of the automatic wood ignition. The use of the rotary knob allows you to set the time (delay) or temperature of the accumulation tank at which the automatic wood ignition (AIW) will occur.
Select the automatic ignition function (time/ temperature) by using the switch I-O-II



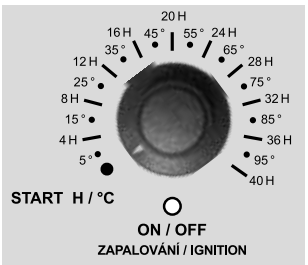
for Automatic wood ignition

If we have already filled the fuel into the stoking chamber of the boiler and inserted the pellets into the ignition chamber, we can plan the ignition itself.

The ignition can be carried out immediately, after a certain time has elapsed, when the accumulation tank is discharged or according to the signal from a remote device (room thermostat with a weekly program, GSM, Wi-Fi, etc.).

INFO - Before activating the automatic wood ignition function, set the flue thermostat of the boiler to the position between Min and Max points, as you are normally used to after firing up the boiler.

Immediate ignition



Move the arrow on the rotary knob to START (large dot).

Set the switch to position **I**.

The ignition will start immediately once 5 seconds have passed when the switch is switched to position **I**.

INFO - In case of repeating process of the automatic wood ignition (new START), always switch the switch to position **O** for at least 2 seconds and then to the desired position **I** or **II**.

Ignition with time delay

Use the rotary knob to set the desired wood ignition delay from 0 to 40 hours. The delay time can be set at each position of the rotary knob between START and 40 H (for example, 22 hours).

Set the switch to position **I**.

When 5 seconds have elapsed after switching the switch to position **I**, the time countdown for the delayed ignition will start.

INFO - In case of repeating process of the automatic wood ignition (new START), always switch the switch to position **O** for at least 2 seconds and then to the desired position **I** or **II**.

Ignition according to the accumulation tank temperature

Use the rotary knob to set the temperature on the accumulation tank sensor at which the wood ignition starts in the range 0 - 95 °C. However, we recommend always setting the temperature higher than 5 °C and the temperature higher than 40 °C (discharge of the accumulation tank).

Set the switch to position **II**.

The ignition function will start once 5 seconds have elapsed after the switch is switched to position **II**.

INFO - In case of repeating process of the automatic wood ignition (new START), always switch the switch to position **O** for at least 2 seconds and then to the desired position **I** or **II**.

After the automatic start of ignition, the fuel ignition process (firing up) will always **be carried out according to a fixed set program**. The 500 W ignition spiral will run for 10 minutes and the boiler exhaust fan will run for 60 minutes. It will be ensured that the boiler is properly fired up, if the boiler operator has properly filled the boiler stoking chamber and inserted the pellets into the ignition chamber.

INFO - If the wood has not been ignited automatically, it is necessary to check that the boiler has been cleaned correctly, the fuel has been placed in the stoking chamber, the pellets have been inserted into the ignition chamber, check the boiler safety thermostat and the fuse on the T4A/1500 - type A boiler panel.

ATTENTION - Any change in the setting is always made with a 5 s delay. This provides protection against unintentional start.

WARNING - The automatic wood ignition function cannot be used as protection against freezing of the heating system.

INFO - The accumulation tank temperature sensor (TV (AIW) (NTC 20 kΩ)) is pulled out through a grommet from the boiler side hood.
The sensor conductors (TV and GND) are connected to the connector together with the **I-O-II** switch

Ignition according to the signal from the remote device

In this case, we don't need to use the rotary knob and the **I-O-II** switch to set anything.

The remote signal (230 V) overrides all settings done with the use of the rotary knob and the switch.

INFO - The function is suitable for receiving a signal from any device with a 230 V / 50 Hz output. Such as room thermostat with more than a weekly program, GSM device, Wi-Fi module and any modern controller.

INFO - Ignition according to the signal from the remote device can be repeated again without switching the switch, only the signal on the S terminal must be switched on at least 10 seconds after the previous switching off.

Setting signalling

The LED indicator placed below the rotary knob is used to signal the correct setting and switching on the automatic wood ignition function.

When the **automatic wood ignition function is activated** after the delay time has elapsed (the switch is in position **I**) or the automatic wood ignition function according to the temperature of the accumulation tank (the switch is in position **II**), the LED indicator under the rotary knob **alternately flashes** (1 sec + 1 sec).

When the conditions for starting the automatic wood ignition function have been met (after the ignition has been started), **the indicator light** (LED) **is permanently on**.

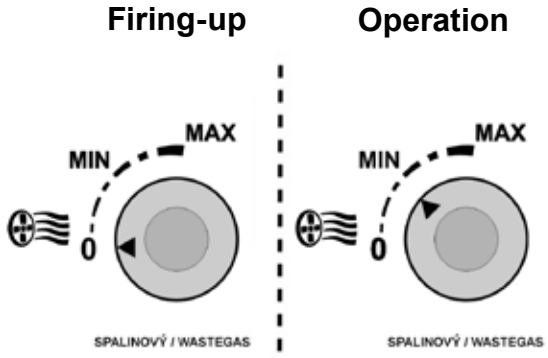
WARNING - If the temperature sensor in the top of the accumulation tank is damaged or disconnected, the LED indicator on the boiler panel will flash 3 times briefly.

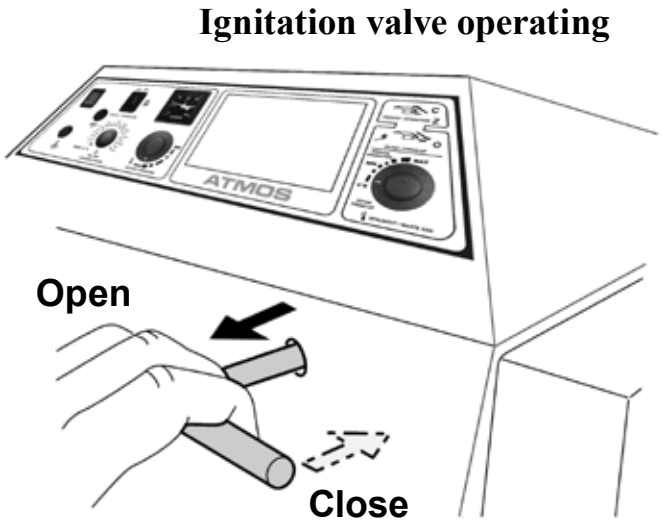
INFO - The AC32 controller is equipped with a battery, thanks to which the controller "remembers" the actions already performed, even in the event of a power failure. If **the battery is discharged**, the controller alerts you to replace it (after activating the function) with **two short flashes.**

Automatic wood ignition canceling

Cancel a scheduled or ongoing automatic wood ignition by switching the switch to **O** position.

Ignition valve control





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

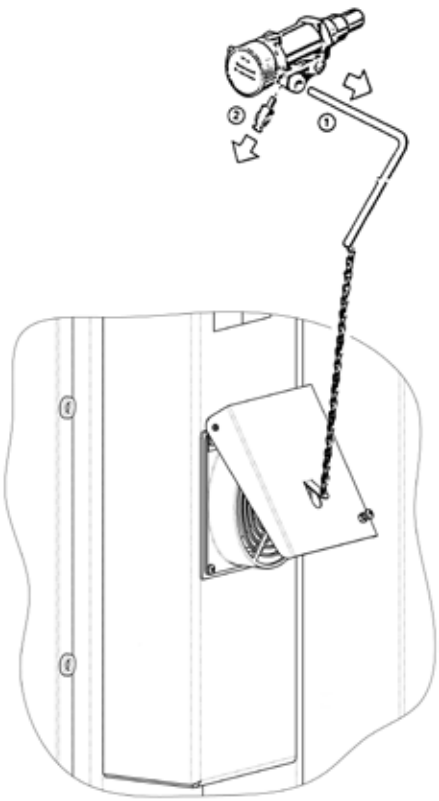
Output regulation is achieved by means of a control flap valve /8/ operated by the FR 124 draught regulator /22/ which automatically opens up or shuts down the valve /8/; depending on the pre-set outgoing water temperature (80 - 90 °C). The output (draught) regulator adjustment should be done carefully 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 boiler.

The exhaust fan is controlled by a **operatin (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.

26. Boiler output and combustion setting

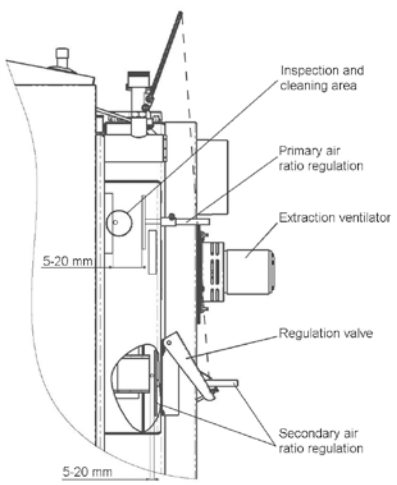
For boilers DCxxS(X), DCxxGS with exhaust fan - version A (two rods)

Basic setting of primary air:

Optimum setting:
Fully closed (5 mm) + 8÷10 mm
Maximum setting:
Fully closed (5 mm) + 10÷20 mm

Basic setting of secondary air:

Optimum setting:
Fully closed (0 mm) + maximum (completly pulled out)
Minimum setting:
Fully closed (0 mm) + 5 mm



The regulation is carried out by either pulling out (+) or retracting (-) the regulating pulling rod.

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).

CAUTION - When commissioning the boiler after installation, always check and adjust the boiler combustion.

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. Before opening the DC70S door, switch the pressure ventilator /4/ off using switch /20/. 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. Steady heat operation

It is possible to use boilers for slow-burning operation, i.e. keeping the fire up overnight without the necessity to heat-up during the day. This is only permitted during wintertime. This operating method however decreases the boiler service life. Prepare the boiler for slow-burning operation in the following way:

- place several (4 – 6) larger logs on a glowing layer of partially combusted fuel
- turn the mixing valve down
  After the valve has been turned down, the boiler water temperature increases to 80 - 90 °C.
- the control flap valve /8/ operated by the FR 124 Honeywell draught regulator automatically shuts down and the ventilator switches off – the boiler operates in maximum output mode

In boilers prepared as previous, the fuel burns for 8 – 12 hours. The actual slow-burn combustion time depends on the amount of fuel placed in the boiler and on the actual quantity of consumed heat. **Even if the boiler operates in the slow-burn mode, it has to keep the output water temperature ranging between 80 - 90 °C and returning water minimum temperature 65 °C.**

29. Boiler cleaning

It is necessary to clean the boilers regularly and thoroughly every 3 to 5 days (heating cyclus) because the flue cinder accumulated in the fuel storage tank together with tars and acids dramatically decreases the boiler's service life and output and insulates the heat transfer surface. If excessive amount of cinder in the lower chamber is left to form, then the burn-off area is insufficient and damage to the ceramic nozzle handle or the boiler may occur.

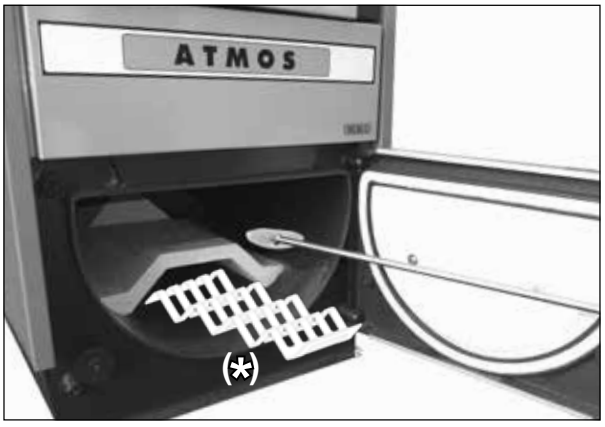
Carry out the cleaning procedure by first switching the extraction ventilator on, then open the loading door /2/ and sweep the cinder down through the slot into the lower chamber. Leave long pieces of wood which has not fully combusted (charcoals) in the hopper for the next time the boiler is used.

Open the cleaning lid /15/ and clean the rear duct with a brush. If the brake valve is inserted in the duct (corrugated sheet), it must be removed before cleaning. Remove all the soot and cinder after opening the lower lid /15/. Open the lower door /3/ and clean the lower chamber from cinder and soot. Remove the layers of dust on the side walls of the lower combustion chamber with a poker or a brush. If there is a roof in the lower combustion area which contains a breaker (corrugated sheet – DC40SX), it is necessary to remove the breaker when cleaning and removing the ash.

The actual 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/, /38/, /39/ when cleaning.

At least once a year clean the extraction ventilator rotating wheel and via the cleaning hole, inspect the state of the primary to secondary air ratio regulation. Boilers DC70S must be checked at least 2x a year and the compressive ventilator and the air duct may need cleaning.

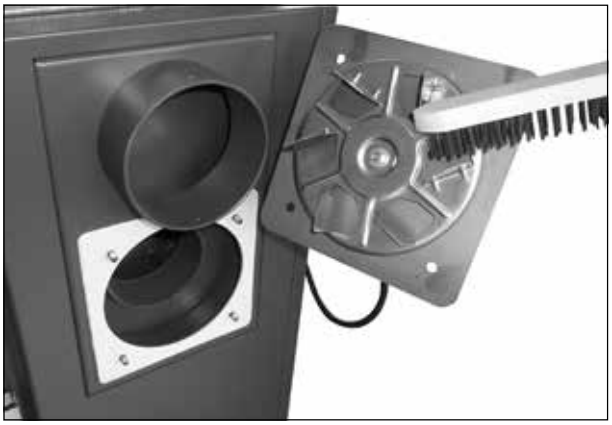
Use the scraper to remove dirt from the arch of the stoking chamber and collect the ash through the combustion nozzle into the ash chamber.
The slot of the combustion nozzle to the ash chamber must never be blocked!



The open lower area of the boiler with the roof and a demonstration of the ash removing with a poker.
Always remove the decelerator when cleaning and removing the ash.
(* decelerator only DC40SX)

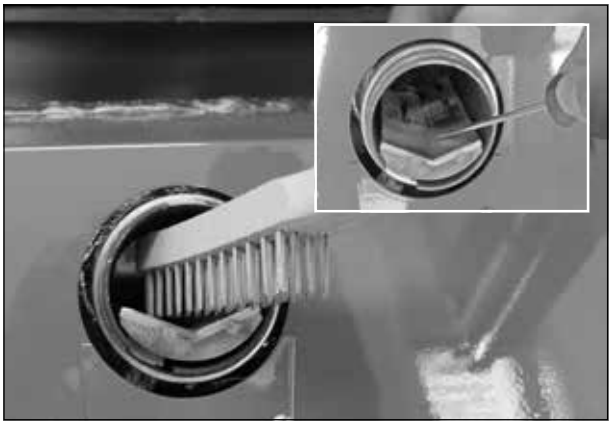
Sample cleaning of the flue way with a wire brush - upper lid
Always remove the decelerator before cleaning.

Sample cleaning of the flue way - bottom lid

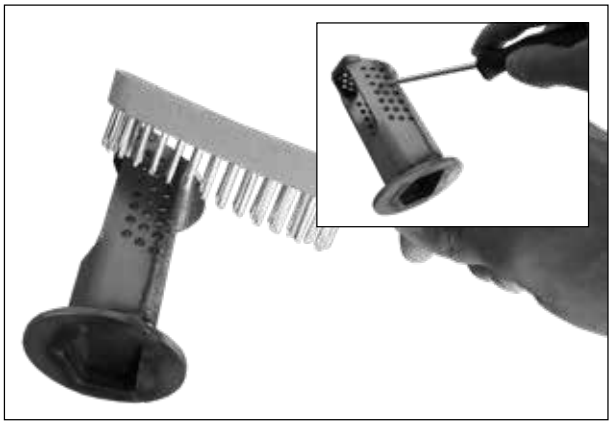


Sample cleaning of impeller and checking uprightness of vane on extract ventilator

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



Example of cleaning the space above the ignition spiral plate



Example of cleaning the ignition chamber

General safety instructions - recapitulation and residual risks

CAUTION - Improper use of the product during operation of the device gives rise to certain residual risks, which must be pointed out. These are mainly caused by the improper attention of the operator and non-compliance with safety principles during operation and maintenance.

Electrical risks

The connection, maintenance and repair of electrical equipment and boiler may only be performed by persons who are professionally qualified in accordance with all applicable national regulations.

The supply cable and the electrical installation of the boiler must be regularly checked and maintained in the prescribed condition (according to the valid regulations).

In case of any damage to the electrical equipment, it is necessary to shut down the equipment (disconnect the equipment from the electricity mains) and provide professional repair.

It is forbidden to interfere with the connection of safety elements that are related to the safety and reliability of the device.

Follow basic safety regulations to avoid the risk of fire, electric shock, and personal injury. Avoid contact with grounded parts.

Do not expose the device to rain and do not use it in wet environment.

Prevent the device from being switched on unintentionally.

Thermal risks

The device must not be operated at a higher working water-pressure than specified.

It is forbidden to overheat or overload the device.

The device must be protected against low-temperature corrosion.

Only the prescribed fuel can be burned in the boiler.

It is forbidden to store flammable substances near the boiler (device).

When operating the device, it is necessary to pay increased attention to the risk of burns from heat sources.

Do not use the device near flammable liquids or gases.

Risks when handling fuel or ash

When handling fuel or ash, solid particles are emitted (dusting). Therefore, the operator should use protective equipment according to the dust level. In general, always use protective equipment.

The applicable fire regulations must be observed when handling fuel and ash.

In accordance with legislation in force, there must be a suitable fire extinguisher provided within the reach.

Ergonomic risks

It is forbidden to insert your hands into rotating or moving parts of the device (fan impeller, fuel auger feeder, ash removal auger).

When operating the equipment, all doors, lids and covers must be properly closed and tightened.

Keep the boiler room in order! Mess in the boiler room can result in injuries.

Take into account the influence of the surrounding environment and provide proper lighting.

Keep other people at a safe distance!

Be careful and check the device for damage.

In case of a defect, contact a professionally qualified person.

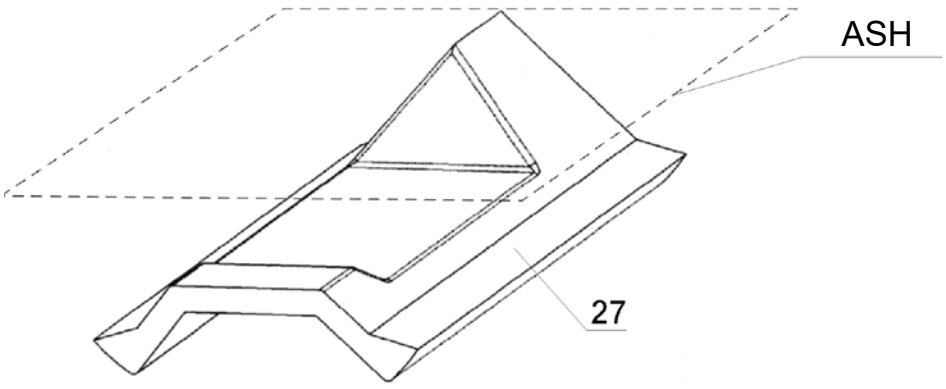
Before commissioning device, read the operating instructions carefully and follow all instructions!

Ceramic ash areas

For type

DC32S

DC40SX



Maximum ash quantity – only up to the upper roof's edge level!

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.

30. 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.**

31. 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.

Personnel training before the first start-up is carried out by the pre-trained company (person) that has installed or commissioned the device.

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.

INFO - Replacement of sealing cords in boiler doors (18 x 18) and cleaning caps (12 x 12) must be performed as needed to ensure perfect tightness.
Replace the sealing cords at least every 5 years.

32. Possible failures and troubleshooting

Failure	Reason	Solution
The "mains" indicator not lit up	- no voltage in network	- check
	- plug incorrectly inserted to el. socket	- check
	- defective power supply switch	- replace
	- defective electric cord	- replace
Doors leaking	defective fibreglass cord	- replace
		- adjust the door hinges
	- the nozzle becomes clogged	- do not burn small-particle wood, sawdust, bark
	- insufficient chimney draught	- chimney defect

Boilers do not reach their required outputs and the pre-set water temperatures	- not enough water in the system	- refill
	- excessive pump output	- adjust the pump's switching and flow rate
	- the boiler output is not sufficiently rated for the particular heating system	- design issue
	- low quality fuel (high moisture content, over sized logs)	- use dry firewood and split logs into halves
	- ignition valve leaking	- repair
	- insufficient chimney draught	- new chimney; unsuitable connection
	- excessive chimney draught	- place a throttle valve (draught limiter) in the flue-gas duct
	- bent blades of draught ventilator (ignition too long or boiler operated with the ignition flap open)	- straighten blades (to a 90° angle) - replace
	- insufficiently cleaned boiler	**- clean**
	- combustion-air inlet to loading chamber is clogged	- clean
Ventilator does not turn	- boiler overheated – safety thermostat fuse out	- press the thermostat push-button (using a pencil)
	- rotating wheel clogged	- clean the ventilator including the ducting from tar and sediments
	- defective capacitor	**- replace**
	- defective motor	- replace
	- bad contact in plug of motor cable lead	- check - measure
The wood ignition failed although the automatic ignition function was switched on	- boiler overheated – safety thermostat fuse out	- press the thermostat push-button (using a pencil)
	- rotating wheel clogged	- clean the ventilator including the ducting from tar and sediments
	- defective capacitor	- replace
	- defective motor	- replace
	- bad contact in plug of motor cable lead	- check - measure
	- incorrectly filled fuel (wood, newsprint paper, pellets)	- follow the instructions in the operating manual
	- defective fuse T4A/1500 - type A	- check – replace
	- defective ignition spiral	- check – replace
	- defective AC32 controller	- check – replace

INFO - In case of failure, check the device and correct the defect.
If you are unable to remove the failure, contact the company that installed or commissioned the product (service).

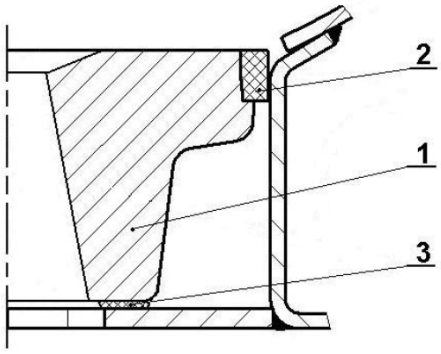
33. Spare parts

Heatproof shaped piece – nozzle	/5/
Heatproof shaped piece - roof	/8/
AC32 controller (code: P0498)	/24/
T4A/1500 fuse - type A	/21/
Switch I-O-II	/20/
Exhaust fan (code: S0131)	/4/
Switch with an indicator light (code: S0091)	/19/
Thermometer (code: S0041)	/18/
Control thermostat (code: S0021)	/17/
Safety thermostat (code: S0061)	/23/
Waste gas thermostat (code: S0031)	/22/
Door sealing cord 18 x 18 (code: S0241)	/25/
Door filling - Sibral (code: S0261)	/16/
Condenser for exhaust fan UCJ4C52 - 1 μF (code: S0171)	/26/
Flue gas breaker	
into flue gas duct - DC40SX (code: S0422)	/27/
under the roof - DC40SX (code: S0427)	/28/
Ignition spiral (code: S1497)	
Ignition spiral plate (code: S1493)	
Removable ignition chamber (code: S1494)	
Removable blanking chamber (code: S1495)	
Filling scoop (code: S1496)	

CAUTION – for boilers **DC32S, DC40SX** use the exhaust fan UCJ4C52 with an open impeller **Ø 175 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 drum by two sets of hinges. Each hinge consists of a nut, which is welded to the boiler drum, 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.

34. 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 and they fall within class 4 and 5 and comply with EU Regulation 2015/1189.

Seasonal space heating emission limits:

$CO \leq 700\ mg/m^3$
$OGC \leq 30\ mg/m^3$
$NO_x \leq 200\ mg/m^3$
$PM \leq 60\ mg/m^3$

(at $O_{2\ ref} = 10\ \%$)

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.
Then take the boiler to a collection point (collection yard) in accordance with the applicable legislation of the country and the EU and the Directive 2012/19/EU of the European Parliament and of the Council.
If there are no clear rules for handling used products in the country, take the boiler drum and hood to a scrap-metal collection site.
Take all the ceramic (fireclay) parts to an approved refuse site or to another designated place.

CAUTION - 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

of the hot-water boiler

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 22 or a TV 60 °C (65/70/72/77 °C) thermoregulatory valve in combination with the accumulation storage tanks (see attached schematics), the guarantee period for the boiler drum 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, Slovakia, 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 REPORT

The installation was performed by:

Company: .....

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

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

Ascertained data:

Chimney:

Dimensions: .....

Height: .....

Chimney draught: .....*

Date of last inspection: .....

Flue-gas duct:

Diameter: .....

Length: .....

Number of elbow pieces: .....

Waste gas temperature: .....*

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

.....

.....

.....

.....

Fuel:

Type: .....

Size: .....

Moisture content: .....*

Measured data:

Waste gas temperature: ..... °C*

Emissions in stabilised state: CO .....*

CO_2 ..... *

O_2 .....*

Ash .....*

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

Stamp: ..... Customer's signature: .....

(Responsible person's signature)

** measured values*

ANNUAL INSPECTIONS RECORDS

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

INFO - Once a year check (review) the technical condition of the boiler room (boiler, chimney, flue duct, control, fittings, etc.).

RECORDS OF GUARANTEE PERIOD AND POST-GUARANTEE PERIOD REPAIRS

Repair: .....

Repair: .....

Repair: .....

Repair: .....

.....
repair carried out by, date

Repair: .....

Repair: .....

Repair: .....

Repair: .....

.....
repair carried out by, date

Repair: .....

Repair: .....

Repair: .....

Repair: .....

.....
repair carried out by, date

Repair: .....

Repair: .....

Repair: .....

Repair: .....

.....
repair carried out by, date

EN

Informační list - Kotle na pevná paliva / Product sheet - Solid fuel boilers

Kotle teplovodní s ruční dodávkou paliva na dřevo / Hot-water boilers for wood with manual fuel supply

Název nebo ochranná známka dodavatele:
Supplier's name or trademark:

Jaroslav Cankař a syn ATMOS

ATMOS

Značka modelu	Třída energetické účinnosti	Jmenovitý tepelný výkon	Index energetické účinnosti	Sezonní energetická účinnost	Preferované palivo	Preventivní opatření		
Model identifer	Energy efficiency class	Rated heat output	Energy Efficiency Index	Seasonal space heating energy efficiency	Preffered fuel	Specific precautions		
		kW		%				
DC 32 S	A+	35	115	78	dřevo / wood			
DC 40 SX	A+	40	115	78	dřevo / wood			