

# **UNI**

## **Cast-iron solid fuel boiler**

# **Installation and operating instructions**

Rev. June 2010

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## 1. INTRODUCTION

Thank you for buying the boiler UNI. Please read carefully this manual before installing and putting the product into operation and keep it during the whole time of its service life. Do not touch or intervene in any parts of the product unless it is explicitly allowed. The installation, maintenance and service of this boiler can be performed only by technicians of a specialized service agency. This manual as well as necessary regulations have to be observed when installing the boiler and specifying its correct location, at establishing the water connection and structuring the chimney.

## 2. CHARACTERISTICS OF BOILERS

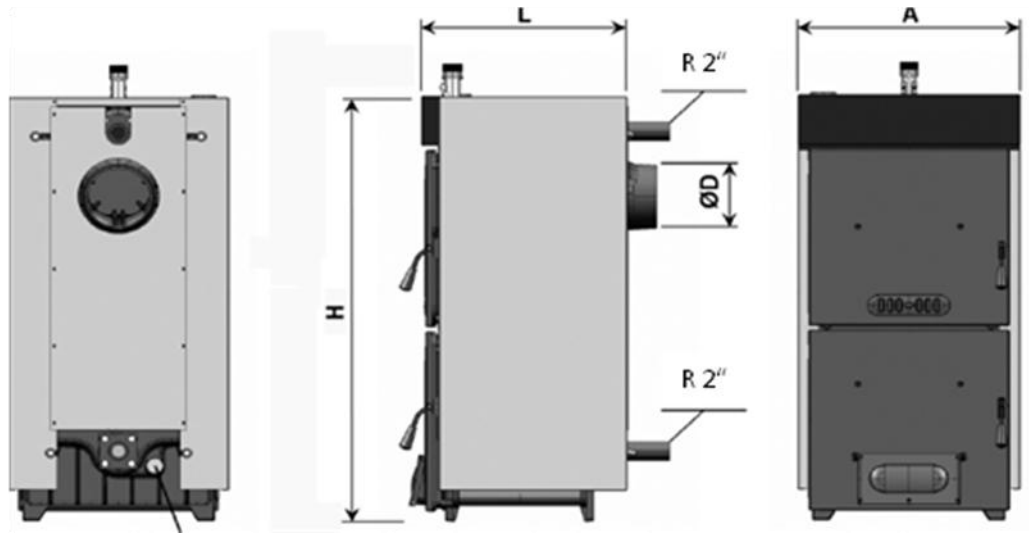
The UNI boiler is a cast-iron sectional boiler for burning solid fuels with three-draught design. It is intended for hot-water heating of single family houses and other objects.

The three-draught boiler design enables to achieve a high efficiency and low emission values. The boiler can be used both in gravity central heating systems and systems with forced circulation.

The boiler burns wood and black coal – fuel specifications are given further in this manual. Because the heating powers of single solid fuels differ from each other, the boiler output varies between the stated maximum and minimum values. Coke can be utilized as an alternative fuel.

## 3. Technical parameters

Model		UNI 3	UNI 4	UNI 5	UNI 6	UNI 7	UNI 8
Number of sectional boiler elements		3	4	5	6	7	8
Fuels		Wooden logs, black coal					
Output range	kW	13 – 16.5	19.5 – 20	24 - 28	27 - 35	30.5 - 44	33.8 – 53
Weight	kg	190	235	280	325	370	415
Water volume	l	22	28	34	40	46	52
Combustion chamber volume	dm <sup>3</sup>	33.0	51.6	70.3	89.1	107.8	126.5
Maximum height of the loaded fuel	mm	280					
Heating water service temperature range	°C	60 up to 90					
Minimum return water temperature	°C	60 (recommended)					
Safety system activated at	°C	95					
Maximum service pressure	bar	3					
Flue gas outlet diameter	mm	160					
Water inlet/outlet connections		2"					
Height (H2)	mm	1 070					
Width (A)	mm	520					
Length (L)	mm	432	537	642	747	852	957
Fuel type		Wooden logs					
Output	kW	13	19.5	24	27	30.5	33.8
Efficiency	%	62-67,5					
Boiler class		1					
Maximum loading combustion time	h	2 up to 4					
Required fuel parameters		Maximum water content 20% Recommended cross-section 10 cm x 10 cm Average calorific value 14 – 18 MJ/kg					
Flue gas average temperature	°C	220 - 300					
Required chimney draught	mbar	0.15-0.2	0.15-0.22	0.15-0.25	0.15-0.26	0.15-0.27	0.15-0.28
Boiler hydraulic loss at Δt=20 °C	mbar	0.13	0.51	1.03	1.81	2.92	4.63
Average CO content at %10 O <sub>2</sub>	mg/m <sup>3</sup>	8 500 – 10 800					
Fuel type		Black coal					
Output	kW	16.5	20	28	35	44	53
Efficiency	%	70.6 – 76.6					
Boiler class		2					
Maximum loading combustion time	h	4 up to 6					
Required fuel parameters		Maximum water content 15% Recommended size between 30 up to 60 mm Average calorific value 26 – 28 MJ/kg					
Flue gas average temperature	°C	220 - 320					
Required chimney draught	mbar	0.15-0.2	0.15-0.22	0.15-0.25	0.15-0.26	0.15-0.27	0.15-0.28
Boiler hydraulic loss at Δt=20 °C	mbar	0.24	0.76	1.46	2.47	3.90	5.84
Average CO content at %10 O <sub>2</sub>	mg/m <sup>3</sup>	4900 - 7400					



Opening to connect the discharge valve R ½"

Figure No. 1 – Boiler schematic illustration

#### 4. Delivery and accessories

The UNI boiler is delivered as follows: complete boiler drum and cardboard package containing the boiler shell and insulation are placed side by side on a palette while boiler accessories are inserted inside the boiler drum. The boiler must not turn over during the transportation.

**Accessories delivered regularly together with the boiler:**

- Draught controller
- Suspension plate
- Cleaning brush
- Scraper
- Fire hook
- Thermomanometer (mounted on the boiler shell upper cover)

**Obligatory accessories for closed heating systems:**

**Two-way safety valve DBV 1 - 02 .**

***This equipment may not be used in the case of open heating systems.***

##### 4.1 Delivery and accessories

**Standard boiler delivery:**

- Boiler on the palette
- Shell in the cardboard package including insulation
- Ashtray (inside the boiler drum)
- Cleaning tools (cleaning brush, scraper, fire hook)
- Thermomanometer (mounted on the boiler shell upper cover) (1 piece)
- Filling and discharge cock Js 1/2" (1 piece)(mounted on the boiler drum)
- Draught controller (1 piece)
- Smoke flap control label (1 piece)
- Shell connection accessories (in the shell cardboard package)
- Heating and return water flange 2" (2 pieces); (mounted on the boiler drum)
- Commercial and technical documentation

**Essential accessories: (not included within the delivery)**

- Two-way safety valve DBV 1 – 02. *This equipment may not be used in the case of open heating systems.*
- Safety valve (1 piece)

**At customer's request: (not included within the delivery)**

- Filter 3/4" (for a boiler equipped with the two-way safety valve DBV 1 – 02)

**The boiler equipment ordered as "essential accessories and at customer's request" is not included within the basic boiler price.**

#### 5. Location and installation

##### 5.1 Regulations and directions

The solid fuel boiler can be installed only by a specialized company validly authorized to execute its installation and maintenance. An installation project according to applicable regulations is required. Before installing the boiler onto an older heating system, the installation company has to rinse out (clean up) the whole system. **The heating system**

must be filled with water corresponding to ČSN 07 7401 and especially its hardness cannot exceed the required parameters.

In case the two-way safety device reacts adding the water that does not comply with ČSN 077401, it is necessary to treat the water inside the system so that it meets again requirements of this standard.

**a) To the heating system**

ČSN 06 0310 Heating systems in buildings – Designing and installation.

ČSN 06 0830 Heating systems in buildings – Protecting equipment.

ČSN 07 7401 Water and steam for thermal energy devices with operating steam pressure up to 8 Mpa.

ČSN EN 303–5 Boilers for central heating systems – Part 5: Central heating solid fuel boiler with manual or automatic fuel supply and maximum nominal output of 300 kW – terminology, requirements, testing and marking.

**b) To the chimney**

ČSN 73 4201 Designing of chimneys and smoke stacks.

**c) With regards to fire regulations**

ČSN 06 1008 Fire safety of heat installations.

ČSN EN 13 501-1 Fire-technical material properties. Building material combustibility grades.

**d) To the system for TUV heating**

ČSN 06 0320 Heating systems in buildings – Hot water preparation – Designing and projection.

ČSN 06 0830 Heating systems in buildings – Protecting equipment.

ČSN 73 6660 Water distribution pipes.

## 5.2. Location options

The UNI boiler must be installed in a separate boiler-room specifically modified for heating purposes. The boiler-room area should be sufficient to enable the boiler installation and maintenance. It must be secured a satisfactory fresh air circulation for the combustion process. The chimney structure must ensure the appropriate draught with regards to the respective boiler type and must meet the building criteria mentioned further in this manual and binding regulations. You can never install the boiler within open spaces or terraces, inside premises inhabited by people as kitchens, living rooms, bathrooms, bedrooms or in areas where explosive or flammable materials are stored.

It is recommended to install the boiler onto a fire-proof concrete base. The base minimum dimensions are stated within the following table:

Model	UNI 3	UNI 4	UNI 5	UNI 6	UNI 7	UNI 8
Base height (mm)	50					
Base width (mm)	600					
Base length (mm)	385	490	595	700	805	910

### Free space

The below-indicated minimum free space should be available around the boiler.

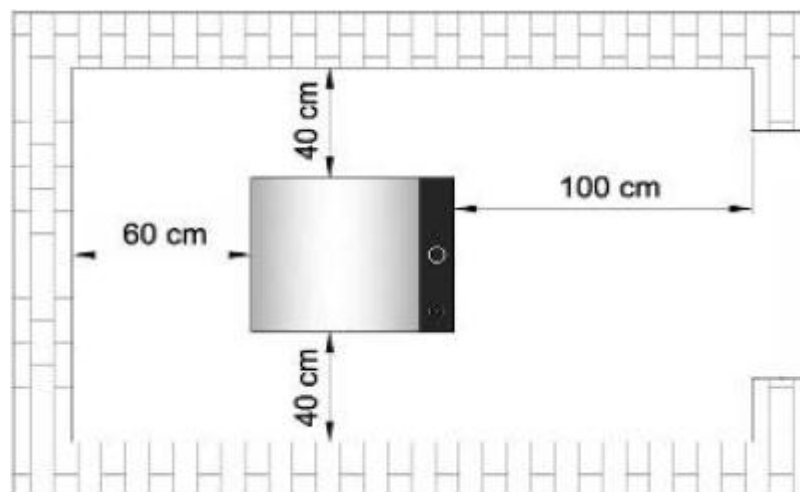


Figure No. 2 – Free space

### Safety distance from flammable materials

– When installing and operating the boiler, it is necessary to observe the safety distance of 200 mm from flammable materials with B, C<sub>1</sub> and C<sub>2</sub> combustibility grades (according to ČSN 06 1008).

- Regarding easily flammable materials with C<sub>3</sub> combustibility grade that burn quickly and alone even after the ignition source has been removed (e.g. paper pasteboard, cardboard, asphalt and tar pasteboards, wood and wood-fibre boards, plastics, flooring materials), the safety distance must be doubled to 400 mm.
  - The safety distance must be also doubled if the building material combustibility grade has not been proven.
- The boiler location with regards to the necessary handling space:
- Basic environment AA5/AB5 according to ČSN 33 2000-3.
  - Minimum handling space of 1000 mm should be reserved in front of the boiler.
  - Minimum distance between the rear boiler part and wall makes 600 mm.
  - Minimum space of 400 mm for accessing the rear boiler part must be reserved from one side at least.

### Combustibility grades of building materials and products

Combustibility grades of building materials and products	Building materials and products classified according to their combustibility grade (selection from ČSN EN 13 501-1)
<b>A</b> – nonflammable	granite, sandstone, concrete, bricks, ceramic tiles, mortars, fire-stopping plasters,...
<b>B</b> – hardly flammable	akumin, izumin, heraklit, lignos, basalt plates and felts, fibre-glass boards,...
<b>C<sub>1</sub></b> – heavily flammable	beech wood, oak wood, hobrex plates, plywoods, werzalit, formica, sirkolit,...
<b>C<sub>2</sub></b> – moderately flammable	pine wood, larch wood, spruce wood, chipboard and cork slabs, rubber flooring materials,...
<b>C<sub>3</sub></b> – easily flammable	asphalt pasteboards, pressed fibre-boards, cellulose materials, polyurethan, styrofoam, polyethylene, PVC,...

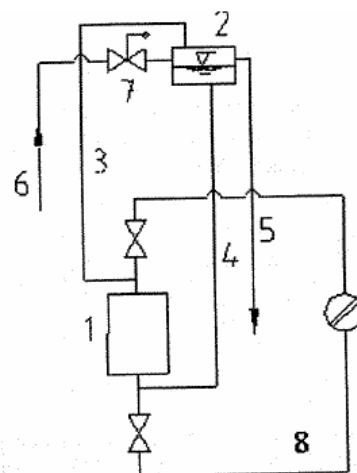
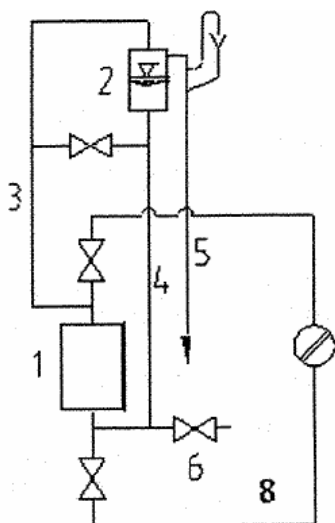
### Fuel location:

- It is strictly forbidden to place the fuel behind the boiler or store it next to the boiler within a distance smaller than 800 mm.
- It is strictly forbidden to place the fuel between two boilers in the boiler-room.
- The producer recommends to keep the minimum distance of 1000 mm between the boiler and fuel or place the fuel into a room being separated from the room where the boiler has been installed.

## 5.3 Installation into the heating system

The protecting equipment against overheating is not necessary in the event of using an open expansion reservoir.

Any heat source within the open thermal system must be connected to the open expansion reservoir being located in the highest thermal system point. The expansion reservoirs must be dimensioned so that they are able to take hold of water volume changes incurred by heating and cooling processes. These open expansion reservoirs have to be equipped with non-shutable aeration and overflow pipelines. The overflow pipeline should be designed in order to drain off safely the highest flow quantity entering the system. This can be reached through dimensioning the overflow pipeline by one DN higher than the filling pipeline. The expansion reservoirs and respective connection pipelines must be designed and positioned so that their freezing is reliably prevented.



- 1 Heat source
- 2 Expansion reservoir
- 3 Protecting pipeline
- 4 Expansion pipeline
- 5 Overflow pipeline

- 6 Filling pipeline
- 7 Water level limiter
- 8 Return pipeline

Figure No. 3 – Examples of connecting the open expansion reservoirs

#### 5.4. Surplus heat removal equipment

The two-way safety valve DBV 1 - 02 serves for removing the surplus heat in case the boiler water temperature exceeds 95°C. This two-way safety valve is connected to boiler flanges as shown in the figure No. 5. If the system is fitted with the two-way safety valve DBV 1 – 02 and the boiler becomes overheated (incoming water temperature is higher than 95°C), the two-way safety valve creates a cold water cycle until the temperature decreases below the limit value. At this moment, the discharge cooling equipment and inlet of cold water being added into the system are closed simultaneously.

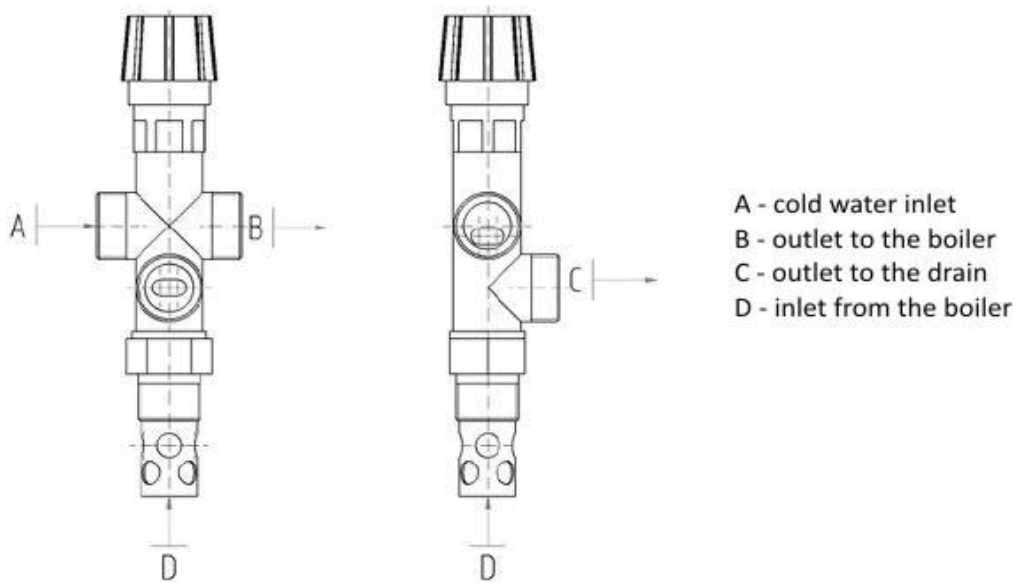
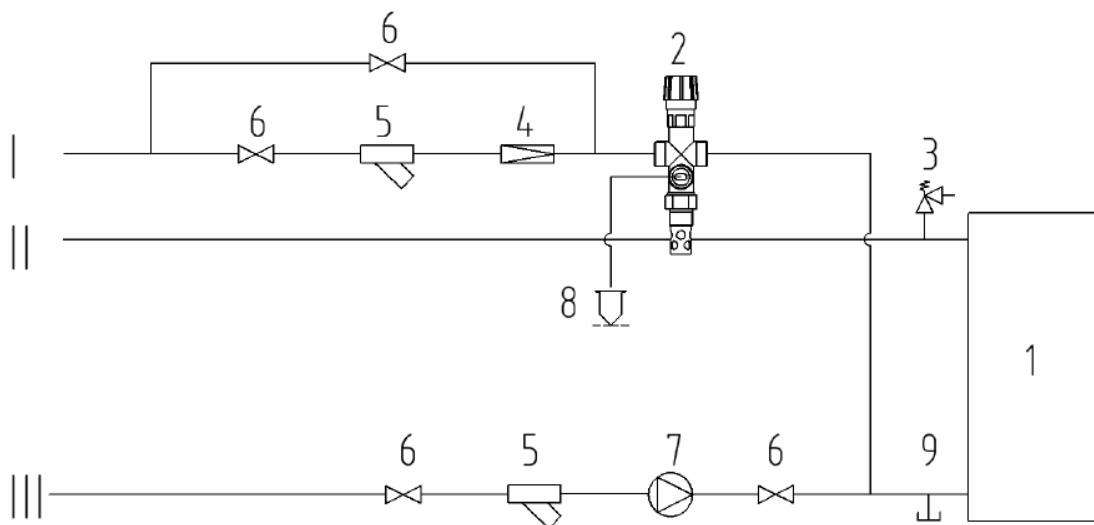


Figure No. 4 – Two-way safety valve DVB 1 - 02



- 1 – Boiler
- 2 – Two-way safety valve DBV 1 – 02
- 3 – Protection valve
- 4 – Reduction valve

- 5 – Filter
- 6 – Ball cock
- 7 – Pump
- 8 – Surplus heat removal
- 9 – Draining cock
- I – Cold water inlet
- II – Heating water outlet
- III – Return water inlet

Figure No. 5 – Recommended scheme of connecting the two-way safety valve DBV 1 - 02

#### **Technical data of the two-way safety valve DBV 1 – 02 (manufactured by the company Regulus)**

Opening temperature (limit value): 100°C (+0°/- 5°C)

Maximum temperature: 120°C

Maximum pressure on the boiler part: 300 kPa

Maximum pressure on the water part: 600 kPa

Nominal flow at  $\Delta p = 100 \text{ kPa}$ :  $1.9 \text{ m}^3/\text{h}$

#### **Application**

The two-way safety valve DBV 1 – 02 is intended to protect the central heating boilers against overheating. The draining and filling valve inside the valve body is controlled by a thermostatic element. When the limit temperature is reached, draining and filling valves are opened simultaneously which means that the cold water flows into the boiler while the hot water is drained off. When the temperature drops below the limit value, draining and filling valves are closed at the same time.

**ATTENTION! This does not supersede the protection valve.**

**In case the two-way safety device reacts adding the water that does not comply with ČSN 077401, it is necessary to treat the water inside the system so that it meets again requirements of this standard.**

#### **Installation**

The installation can be performed only by a professionally competent person. In order to secure a correct function of the thermostatic two-way safety valve, it is necessary to adhere to specified conditions of its installation and respect the flow direction marking on the valve body. The safety valve should be always mounted into the outlet boiler pipeline or directly onto the boiler in its upper part where the heated water leaves the boiler being distributed into the heating system. When attaching the valve, it is essential to check whether the usage of 3/4" sleeve piece – that can be mounted either inside the pipeline or on the boiler – ensures a full submersion of the thermostatic valve element following the valve installation. After mounting into the sleeve piece, the discharge conduit draining the hot water from the boiler shall be connected at the point "C" (figure No. 4). The inlet of cold water (according to the figure No. 5) that ensures the boiler cooling after the valve is put into operation shall be connected at the point "A" (figure No. 4). A filter for retaining mechanical impurities must be fitted onto the cooling water inlet. At the point "B" (figure No. 4), a conduit shall be attached leading into the heating system reverse pipe in the boiler vicinity (according to the figure No. 5).

#### **Regular maintenance**

Turn the safety valve head once a year to remove pertinent impurities formed inside the valve. Clean up the filter fitted on the cooling water inlet.

#### **Heat removal equipment – storage reservoirs**

It is recommended to install a storage reservoir in case the required volume exceeds 300 litres.

A calculation of the stack exchanger smallest volume:

$$V_{sp} = 15T_b \times Q_N (1 - 0,3 \times (Q_H/Q_{min}))$$

Where:

$V_{sp}$  = storage reservoir volume in litres

$Q_N$  = nominal heat output in kW

$T_b$  = burning time in hours

$Q_H$  = building thermal load in kW

$Q_{min}$  = lowest heat output in kW

The storage reservoir dimensions at central heating boilers operated with single specified fuels must be determined according to the output of the largest storage reservoir. However, this storage reservoir is not necessary if the calculated volume is smaller than 300 l.

#### **5.5. Chimney connector**

The UNI boiler must be connected to an independent chimney ensuring at least the required minimum draught. The smoke stack between the boiler and chimney should be insulated with mineral wool. The smoke stack leading to the chimney and chimney itself must be made out of steel or equivalent material which may be used at temperatures around 400°C. All joints of the exhausting system must be sealed to enable a good burning and high efficiency. The



smoke stack must be attached to the chimney through the shortest way possible and shall comply with dimensions stated within the subsequent scheme. Any horizontal connections and equipment increasing the pressure losses, as bends, have to be excluded.

A compact vertical steel pipeline should not be used as the chimney. The chimney must consist of one inner and one outer layer. The outer layer can be made out of steel or bricks. Regarding the inner layer, stainless steel parts are preferred because of corrosion. The space between the inner and outer layer must be insulated in order to prevent the condensation in flue gases.

A cleaning hole made out of steel and sealed against a possible leakage should be prepared at the lowest chimney level.

The smoke stack length between the boiler and chimney should not exceed 100 cm.

The chimney diameter must be by 10% larger than the smoke stack diameter on the boiler. As regards the chimney total height and minimum inner diameter, the following scheme should be taken into account with reference to the boiler output unless stated otherwise within respective binding regulations.

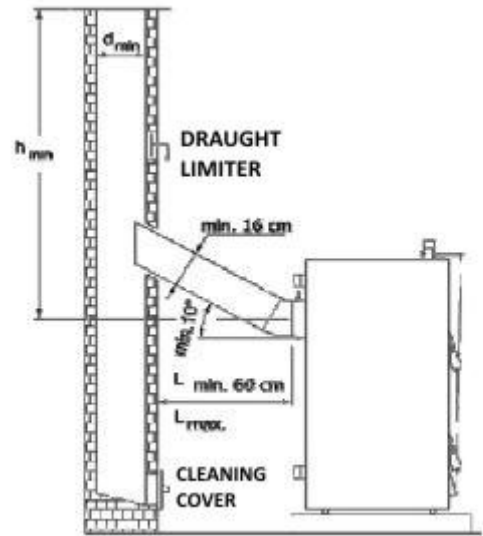


Figure No. 6 – Example of the chimney connection

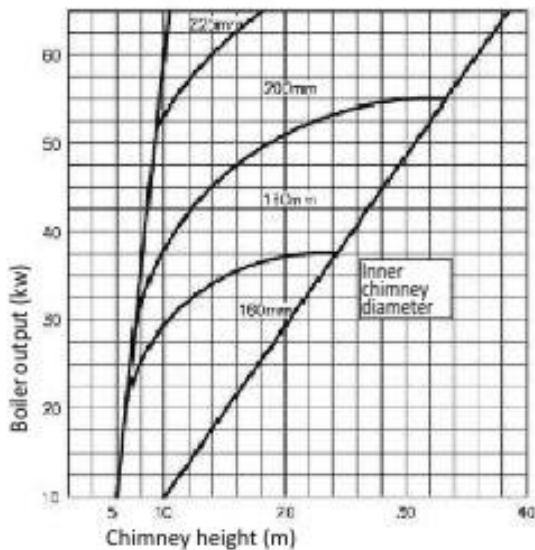


Figure No. 7 – Determination of the chimney diameter

The highest outdoor chimney level should be in compliance with dimensions presented on the following sketch in order to minimize any harmful environmental impacts and improve the chimney draught.

## **5.6. INSTALLATION PROCEDURE**

### ***Boiler installation – in the closed heating system with the two-way safety valve DBV 1 - 02***

- 1. Place the boiler drum onto a base wall (pad).*
- 2. Connect the heating water flange to the heating system.*
- 3. Connect the return water bottom flange to the heating system.*
- 4. Connect the two-way safety valve DBV 1 – 02 (according to the figure No. 5) to the return heating water flange, cooling water inlet and surplus heat outlet.*
- 5. Put the smoke extension on the smoke pipe and insert into the chimney opening.*
- 6. Screw the draught controller into the opening in the upper part of the front sectional boiler element. The procedure of adjusting the boiler draught controller is presented within the manual enclosed to the respective controller.*

### ***Shell installation***

- 1. Remove shells from the cardboard package.*
- 2. Put the left and right shell part on the anchoring screws and fix them to the boiler drum in the front part using screws and nuts (right part with the aid of screws – 3 pieces, left part with the aid of nuts – 3 pieces; at the same time, they serve for attaching the suspensions of feeding and ashtray doors.*
- 3. The thermomanometer is already inserted in the upper shell part. Insert the temperature gauge into the thermometer well located in the upper part of the front boiler drum sectional element and insert the pressure gauge into the well of outgoing (heating) water flange. The pressure gauge capillary must not touch the boiler drum.*
- 4. Install 4 pieces of fastening pins into the upper shell part. Put the upper cover onto side shell parts – insert the fastening pins into prepared feathers.*
- 5. Put the rear shell part on and bolt it to the side and upper shell parts with the aid of screws.*

### **Filling the heating system with water**

The water hardness must meet requirements of ČSN 07 7401 – if it be to the contrary, treat the water as given in the chapter No. 5.1.

Heating systems fitted with the open expansion reservoir enable a direct contact of the heating water with atmosphere. In the course of heating period, the water expanding in the reservoir absorbs oxygen which enhances its corrosive effects and, at the same time, evaporates significantly. For refilling the system, only water treated onto values complying with ČSN 07 7401 can be used.

The heating system must be thoroughly rinsed to remove all impurities. It is necessary to maintain a stable water volume in the heating system during the course of heating period. When adding water into the heating system, it is inevitable to look out for preventing any air induction into the system. Water from the boiler and heating system must never be drained or taken at disposal except for cases indispensably needed, e.g. in the event of repairs etc. A drainage and filling of new water increase the danger of corrosion and scale forming. **If it is necessary to refill water into the heating system, add it only into a chilled boiler in order to avoid disruptions of sectional boiler elements.**

**After filling the boiler and heating system, it is essential to check the tightness of all joints. When using the two-way safety valve DBV 1 – 02, the cooling water is added gradually into return water.**

The termination of installation and heating test execution must be recorded in the “Certificate of warranty”.

## **6. OPERATING INSTRUCTIONS**

### **6.1. Putting into operation – instructions for a specialized service organization**

*The boiler can be put into operation only by specialized installation companies entitled to performing all respective activities.*

#### **Inspection activities before the start-up**

*Before putting the boiler into operation, it is necessary to check:*

- a) Filling the heating system with water (check of the thermomanometer) and system tightness.*
- b) Connection to the chimney – **this connection can be done only upon approval of the respective chimney company (chimney revision).***
- c) Functionality of the draught controller and thermostatic valve.*

### **6.2. Putting the boiler into operation**

- 1. Fire the boiler.*
- 2. Set the boiler to the needed service temperature – recommended temperature of the outgoing water is 80°C.*
- 3. Adjust the draught controller including the chain length (in accordance with the enclosed draught controller instructions).*
- 4. Check the functionality of safety equipment against overheating (two-way safety valve DBV 1 - 02).*
- 5. Run the boiler under operating conditions in compliance with respective standards.*
- 6. Recheck the boiler tightness.*
- 7. Inform the user how to operate the boiler.*
- 8. Make entry into the certificate of warranty.*

### **6.3. Firing**

- 1. Check the amount of water inside the heating system using the thermomanometer.*
- 2. Open the shutting armatures between the boiler and heating system.*
- 3. Check whether the chimney draught as regards the connected product is sufficient.*
- 4. Clean up the fire grate, ashtray, smoke stacks and boiler walls.*
- 5. Open the ashtray and flue gas chamber doors. Lay the kindling and wood onto the cleaned fire grate along the whole boiler depth.*
- 6. Put the smoke flap inside the smoke extension to the position “open” and close the auxiliary air inlet of the feeding door.*
- 7. Fire the kindling through the open combustion chamber door and close it subsequently.*
- 8. The ashtray door should remain opened until the kindling fires perfectly. It is recommended to lay another weaker layer of the basic fuel onto the burning kindling.*
- 9. Close the ashtray door after it fires well – add further fuel through the feeding door up to its lower edge and align the fuel into an even layer along the whole boiler depth.*
- 10. Set the primary air supply using the draught controller after closing the ashtray door – recommended temperature adjustment makes at least 70°C.*
- 11. As soon as the fuel merges into deep red glow, open slightly the auxiliary air inlet in the feeding door.*

#### **6.4. Operation**

1. After reaching the heating water temperature, adjust the supply of combustion air. The boiler output can be roughly regulated by changing the chimney draught with the aid of smoke flap inside the smoke extension. A fine output regulation is achieved by using the auxiliary air choker that adjusts the air supply under the fire grate through the draught controller. Set up the draught controller so that the ashtray door choker is almost closed when the required heating water temperature has been reached.
2. During the operation, the boiler must be refueled depending on the heat requirements and combustion intensity. Feed the fuel so that the fuel layer is evenly high along the whole boiler depth. The fuel should be added up to the maximum height of 2 cm below the bottom margin of feeding space opening.
3. When burning black coal or wood, it is necessary to keep slightly open the auxiliary air inlet of the feeding door all the time during which the gases and flames from the freshly fed fuel are evolving. If adding any new fuel, open slightly the feeding door by about 2 cm and wait for 10 seconds approximately until the flue gases are exhausted into the chimney. Afterwards, you may open the door completely.
4. When changing over to the lowered night service, clean up the fire grate, let the freshly fed fuel burn up well and then suppress the boiler output by choking the chimney draught with the aid of smoke flap located in the smoke extension and closing the auxiliary air inlet flap in the feeding door. It is always necessary to prevent any leakage of flue gases into the area of boiler-room. If a leakage occurs, the draught controller must be totally inactivated (close the choker completely).
5. In the morning, recover the boiler operation by unclosing the smoke flap and raking up the fire grate after the ashtray door is opened.
6. Ashtray door must be permanently closed during the boiler operation.
7. Empty the ashtray according to needs (it is necessary to use gloves).
8. When using shut-off valves, it is necessary to install the protection valve between the boiler and shut-off valve.
9. It is recommended to clean up the filter after the heating test is finished and subsequently before starting the heating period.

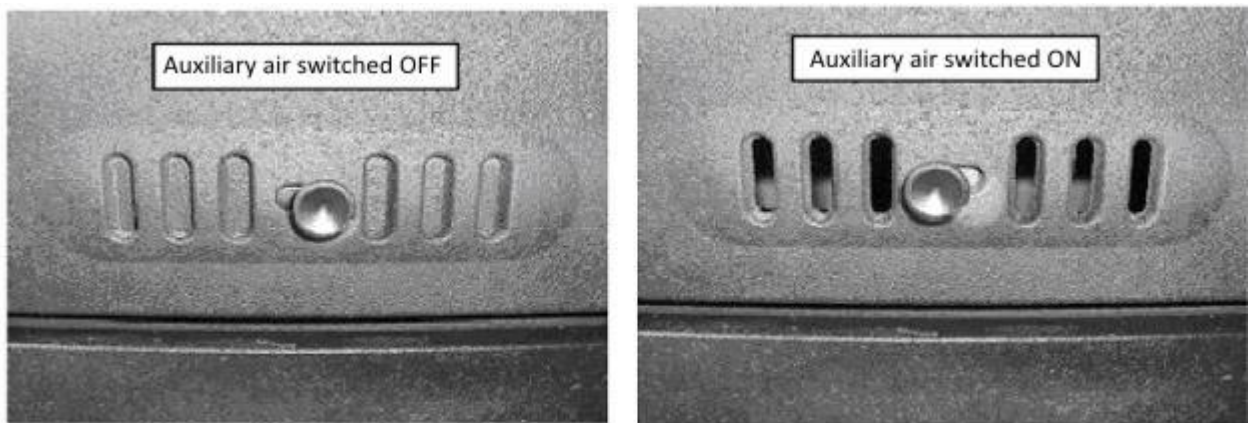


Figure No. 8 – Auxiliary air choker

#### **Suspension plate**

UNI is a three-draught boiler. It is equipped with a suspension plate (50) on the boiler front sectional element to avoid leakage of flue gases from the boiler when the upper door is opened. The suspension plate also protects the upper door against overheating.

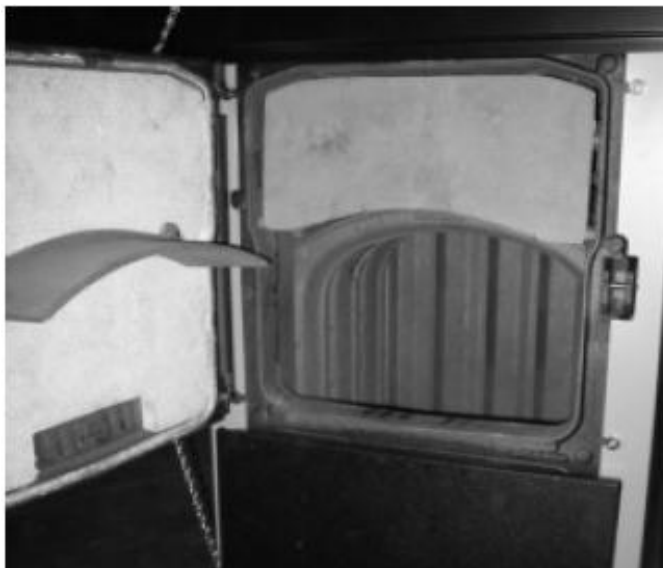


Figure No. 9 – Suspension plate

You can lift the suspension plate when feeding a new fuel – however, keep it always in the right position to maintain an efficient combustion.

#### 6.5. Fuel

The fuel must meet the data presented within the section on technical parameters. The manufacturer does not bear any liability for problems caused by using fuels that are not suitable with respect to this boiler.

## 7. MAINTENANCE AND CLEANING

A regular maintenance performed by skilled personnel in compliance with the manufacturer's instructions is necessary for ensuring the effective system operation.

### 7.1. Maintenance

- Remove ash from the ashtray during the boiler operation several times a day depending on the used fuel because the full ashtray prevents the correct distribution of combustion air under the fuel and causes uneven fire penetration of the fuel laid on the grate. Remove all residues from the combustion chamber, especially slag, before any new firing and in the course of the morning recovery of boiler operation. The ash should be gathered into non-flammable containers equipped with a cover. **When working, use protective means** and pay attention to your personal safety.
- While burning black coal or wood, clean up regularly the boiler walls inside the combustion chamber, boiler smoke draughts and smoke extension (using a brush when the boiler is cooled down and temperature does not exceeds 40°C) once a month.
- When using fuels with larger evolution of gas and tar deposits contaminate the walls of combustion area, remove them by burning dry and hard wood while putting the boiler onto the maximum service temperature.
- Attend properly the smoke flap swivels and pivots of all doors after the heating season is over.

### 7.2. Regular inspections

- In the case of open system, check the water level inside the expansion reservoir. In the case of closed system, deaerate the whole heating system and adjust the system water pressure according to the water column height at maximum temperature of 40°C. If the water level or pressure is below the level of water column height after the boiler is filled for the first time, it is necessary to supply additional water into the system and deaerate it again. The water to be added into the system must be treated in compliance with local regulations (see the chapter 5.1.) in order to avoid corrosion inside the heating circle and boiler. The water refilling into the heating system can be done only if the boiler is cold otherwise the cast-iron elements may crack.
- Check the boiler front door whether the seal is functional. Replace the door gaskets where appropriate.
- Check the insulation condition inside the front door. If it is damaged, the front door surface temperature would be higher. In this case, it is necessary to replace the insulation in order to save energy and prevent further cracking.
- Check whether flue gases leak from the chimney connector and get it repaired if they do.
- Check the correct function of draught controller in the boiler upper part. In case of need, you can easily adjust the controller to achieve better burning and output of your boiler. If the combustion air amount is not sufficient, you may observe an excessive soot deposition on heating surfaces and smoke evolution (or smell). Set up the flap of primary air so that larger air volume is sucked in for more efficient burning. If the combustion air quantity is redundant, solid fuels are consumed quickly. In such a case, it is recommended to reduce the air supply – either by the primary air flap or smoke flap.
- Check the surfaces transferring the heat from cast-iron elements. The soot formation will vary in dependence on the kind of fuel that you are using and combustion air quantity. If you feel that the outgoing water temperature cannot reach the usual value under the same conditions, it is recommended to clean up the boiler heating surfaces.

### 7.3. Boiler cleaning

Before cleaning the boiler, switch off the pump and other electrical appliances in the boiler-room. Clean up the boiler only when it is cooled.

When cleaning the boiler, remove the suspension plate (50) shown in the figure No. 11.

When cleaning the boiler:

- \* Clean up all heating surfaces using the brush supplied together with the boiler.
- \* Clean up the flue gas routes using the supplied brush.
- \* Sweep the deposited soot down to the ashtray area.
- \* Remove the waste.

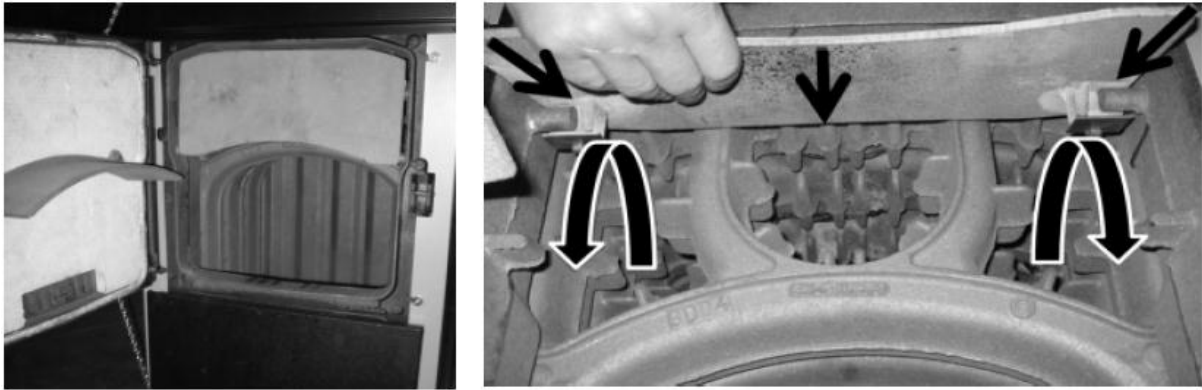


Figure No. 10 – Procedure of removing the suspension plate

### Annual inspection

Before any heating season, it is recommended to invite a representative of specialized service organization to inspect the condition of boiler, heating system, electrical connections and chimney. Do not attempt to perform any maintenance work without assistance of qualified persons.

## 8. HEALTH AND SAFETY INFORMATION

### Sharp edges

Give attention when handling iron-plate panels having unsecured or sharp edges.

### Pressure equipment

1. Avoid contacts with pressure parts of the heating system during the boiler operation. These dangerous parts are:
  - Boiler sectional elements
  - Boiler input and output conduit
  - Safety conduit
  - Pressure protection equipment mounted on the heating system
2. Never attempt to drain water from the heating system while the boiler is operating.
3. Never, and by any reason, feed cold water directly into the boiler while it is operating and hot – if you do it, the boiler sectional elements may be damaged (cracks). **When using the two-way safety valve DBV 1 – 02, the cooling water is gradually added into return water.**

### High temperature surfaces

Avoid contacts with high temperature parts and surfaces being dangerous for humans as further indicated:

- Boiler feeding door
- Ashtray door in the front
- Water input and output conduit (although it is insulated), safety conduit
- Smoke stack
- Connector between the smoke stack outlet and chimney
- Circulating pumps, expansion reservoirs

### Boiler-room

1. Make sure that the boiler-room can be easily left in the case of emergency related to the heating system.
2. Do not leave the solid fuels and auxiliary material (kindling, paper, etc.) for firing the boiler within the distance shorter than 800 mm from the boiler.
3. Do not cover openings that supply fresh air into the boiler-room because the air supply is very important for good burning.

### Flue gases

1. When the feeding door is opened, a small amount of gas can be released on the front boiler side. Never inhale this gas.
2. When feeding solid fuels while the combustion chamber interior is glowing, protect your hands and face. Use protective gloves.

### Fuel combustion

1. Do not remove the fuel from combustion chamber while still burning.
2. Do not attempt to extinguish the burning fuel with water or other liquids.
3. Do not leave the feeding door or ashtray door opened while the fire is still present inside the combustion chamber.
4. Close the air inlets and chimney outlets when trying to slow down the fire or stop it.

5. Your boiler can burn only solid fuels specified within the section “Technical parameters”. Never use any different solid fuel which can be harmful to the structure of boiler sectional elements as well as any liquid or gas fuel.

## 9. IMPORTANT WARNINGS

Adhere to safety instructions when installing and running the UNI boiler:

- *The boiler can be operated only by adult persons familiar with these operating instructions. It is unpermissible to leave children at the boiler beyond control of adults. Interventions into the boiler design that could threaten the health of attending personnel or roommates are forbidden.*
- *The boiler is not intended for being operated by persons (including children) whose physical, sensual or mental disability or lack of experience and knowledge inhibit them from a safe usage of the appliance unless being supervised or instructed about the appliance usage by a person responsible for their safety.*
- *Children should be watched in order to ensure that they do not play with the equipment.*
- *In case the flammable vapours or gas may be created and released into the boiler-room or when performing activities during which a temporary risk of fire or explosion may occur (gluing of floor clothes, coating with flammable paints), the boiler must be put out of operation before commencing such activities.*
- *It is FORBIDDEN to use flammable liquids for firing the boiler.*
- *It is FORBIDDEN to overheat the boiler during its operation.*
- *No subjects made out of flammable materials may be placed on the boiler or within a distance shorter than the safety distance.*
- *When removing ash from the boiler, no flammable materials may be placed within the minimum distance of 1500 mm around the boiler.*
- *When operating the boiler at temperatures lower than 60°C, a moisture condensation on the boiler drum may occur (so called low-temperature corrosion) which shortens the boiler drum service life. Therefore, it is recommended to operate the boiler at temperatures above 60°C.*
- *After the heating season, it is necessary to clean up thoroughly the boiler, smoke stacks and smoke extension. Lubricate the pivots, smoke flap mechanism and other movable boiler parts with graphite grease. Keep the boiler-room clean and dry.*
- *Pertinent signs of corrosion on the boiler drum cannot be considered as defects and do not affect the boiler function.*
- *The system must be fitted with a protection valve (maximum overpressure of 300 kPa) dimensioned in accordance with the nominal boiler output. If you have any other questions, please address the respective specialized installation companies and service organizations.*
- *In case the two-way safety device reacts adding the water that does not comply with ČSN 077401, it is necessary to treat the water inside the system so that it meets again requirements of this standard.*
- *The UNI boiler must be connected to a suitable separate chimney designed in compliance with instructions stated further within this manual and mandatory regulations. The chimney must show the draught values required for the given boiler model. The boiler may not be operated unless the chimney connector is ready and sufficient burning draught ensured.*
- *Always ensure a satisfactory fresh air supply into the boiler-room – see the instructions for placing and installing the boiler.*
- *Do not install the boiler within an area being shared or used by persons or in the place with any direct openings to habitable rooms.*
- *If the hydraulic circle is not equipped with the safety heat exchanger system according to instructions provided in this manual, the boiler must be installed into the open system.*
- *Do not drain any water from the hydraulic circle except for the cases of maintenance or risk of frost. The hydraulic system may be refilled with the anti-freeze fluid Friterm.*
- *Do not feed cold water directly into the boiler overheated for any reason. This might lead to cracking of boiler sectional elements. **When using the two-way safety valve DBV 1 – 02, the cooling water is gradually added into return water.***
- *Do not fire the boiler with the front door opened.*
- *The heating system should enable the water flow corresponding to the boiler output and temperature difference between the incoming and return water should not exceed 20°C.*
- *Check regularly whether the heating system is filled with water.*
- *Boilers should be installed directly onto a flat and smooth floor made out of non-flammable materials. It is recommended that the height of pedestal is 50 mm at least and its other dimensions are bigger than ground plan dimensions of the boiler. This pedestal isolates the boiler from water spilled on the floor.*
- *If the boiler is installed into an old heating system, the heating system must be rinsed and cleaned from all contaminants before the boiler is connected.*
- *Your boiler cannot switch the pump on and off automatically. The pump must be switched on if the boiler temperature is higher than temperature of cold water or if the fuel is burnt inside the combustion chamber. Never switch the pump off unless the fire is completely quenched.*

- *Water in the boiler should never reach high temperatures when the pump is switched off. In such a case, an immediate supply of cold water into the hot boiler may cause cracks of the boiler drum due to high thermal energy.*
- *If the draught controller does not work properly, change its adjustment step by step as described in the draught controller manual.*
- *If the chimney draught is not sufficient or completely missing (e.g. the chimney is blocked, uninsulated or built incorrectly, etc.), you can experience combustion difficulties (no fire, excessive smoking, condensation resulting from the cold flue gases). In this case, it is strictly recommended to inspect the chimney by an expert and repair all possible irregularities. Your boiler has been designed on the principle of natural draught – therefore, the correct chimney installation is so important.*

## **10. Guidelines on the product end-of-life disposal**

*It is recommended to dispose the wrappage as follows:*

- *Plastic foil, cardboard package – use the junk services.*
- *Metal strapping tape – use the junk services.*
- *Wooden base is disposable and cannot be further utilized as a product. Its liquidation is subject to the law No. 94/2004 Coll. and 185/2001 Coll., as subsequently amended.*

*Because the product is made out of ordinary metal materials, it is recommended to dispose single components as follows:*

- *Exchanger (grey cast-iron) – use the junk services.*
- *Conduits, shell – use the junk services.*
- *Other metal parts – use the junk services.*
- *Insulation material ISOVER – use a company dealing with waste collection and disposal.*

## **11. Warranty and liability for defects**

***Manufacturer provides the following warranty:***

- *Boiler: 24 months since the date of putting the product into operation; 30 months at most since the date of dispatching from the manufacturing plant.*
- *Boiler drum: 5 years since the date of dispatching from the manufacturing plant.*

***The user is obliged to entrust a specialized installation company with putting the boiler into operation whereas all defects may be solved and removed only by a professional contractual service organization – if this is not respected, no warranty on the proper boiler function is applicable. After filling in the form “Certificate of quality and completeness of the UNI boiler”, it serves as the “Certificate of warranty”.***

***The user is obliged to perform a regular maintenance on the boiler.***

***Any notice of failures must always be made in writing and by phone without any delay after the respective defects have been found.***

***If the given instructions are not observed, the warranty provided by the manufacturer cannot be recognized. The manufacturer reserves the right to alterations resulting from the product innovations which may not be contained within this manual.***

***The warranty does not apply to:***

- ***Defects caused by incorrect installation procedures, incorrect product operation or incorrect maintenance – see the chapter 9.***
- ***Damage of the product during the transportation or other mechanical damage.***
- ***Defects caused by incorrect storage conditions.***
- ***Defects caused by neglecting the water quality within the heating system – see the chapter No. 5.1. and 6.2.***
- ***Defects caused by neglecting the instructions stated in this manual.***

***The manufacturer reserves the right to alterations resulting from the product innovations which may not be contained within this manual.***



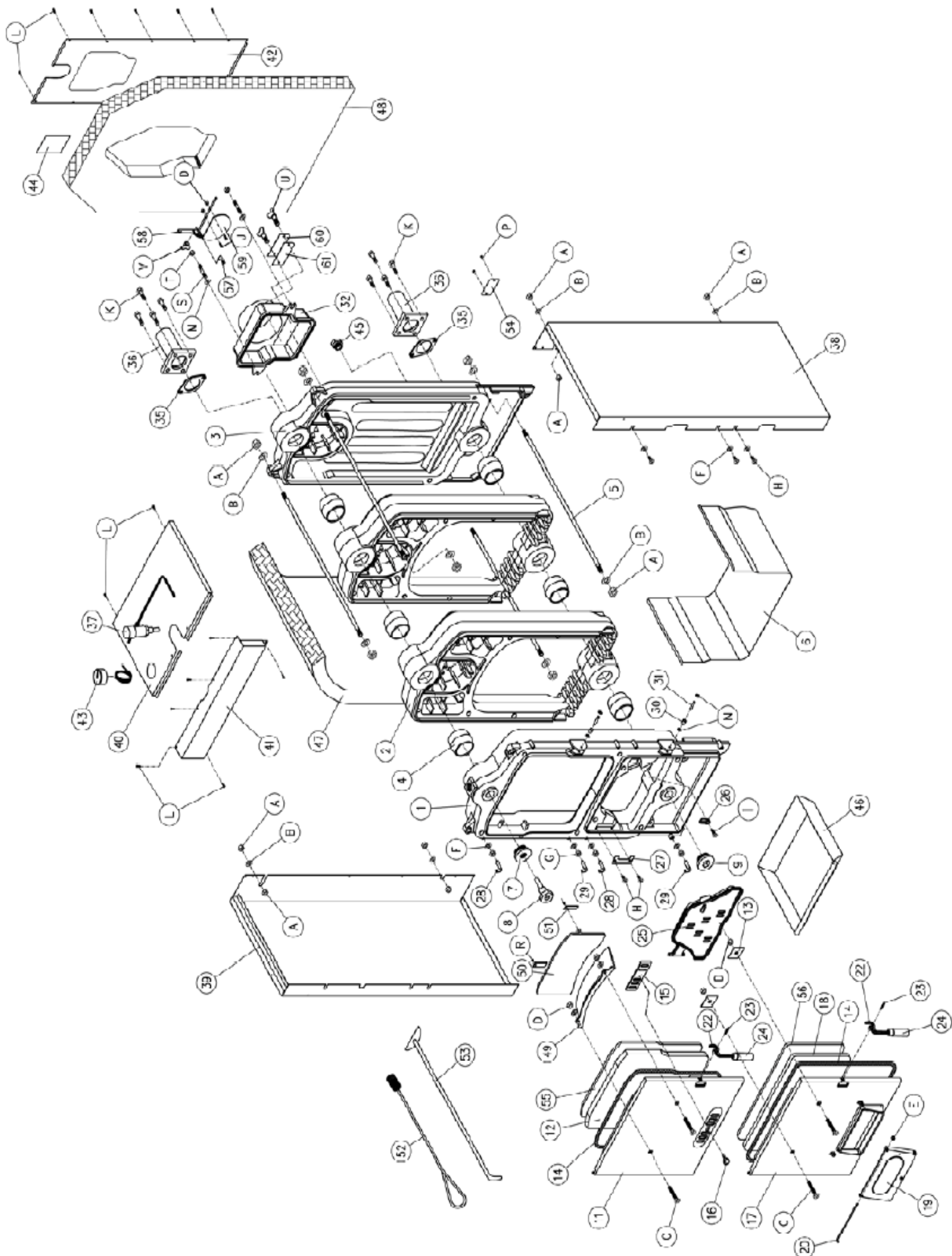


Figure No. 11 – Boiler assembly

Legend to the figure No. 11

Position	Title
1	Front sectional element
2	Central sectional element
2	Central sectional element with recess
3	Rear sectional element
4	Nipple
5	Anchor bolt
6	Boiler drum bottom
7	Reduction 1 1/2"-1/2"
8	Thermometer well R1/2"
9	Plug 1 1/2"
11	Feeding door cover
12	Feeding door insulation
13	Special pad under the door insulation
14	Gasket – diameter 12 mm
15	Auxiliary air choker
16	Auxiliary air choker screw
17	Ashtray door cover
18	Ashtray door insulation
19	Primary air choker
20	Primary air choker axis
22	Feeding door handle
23	Door handle fixing screw
24	Door handle
25	Combustion chamber door
26	Swivel
27	Combustion chamber door suspension
28	Upper door suspension
29	Bottom door suspension
30	Door closure bushing
31	Door closure pin
32	Smoke extension

Position	Title
33	Smoke flap controller
34	Smoke flap
35	Flange seal
36	Flange
37	Draught controller
38	Right shell side part including insulation
39	Left shell side part including insulation
40 a 41	Upper shell part including insulation
42	Rear shell part including insulation
43	Thermomanometer
44	Identification label
46	Ashtray
49	Feeding door closure plate
50	Suspension plate
51	Suspension plate hangers
A	Nut M12 TS1026/1
B	Washer A13 TS 79/2
C	Screw M6x40
D	Nut M6 TS1026/1
F	Washer A8.4 TS79/2
G	Nut M8 TS1026/1
H	Screw M8x15
I	Screw M8x20
J	Screw M6x30
K	Screw M10x25
M	Washer A10.5 TS 79/2
N	Retaining stirrup ring
R	Screw M6x12
S	Screw M10x40
T	Nut M10 TS1026/1

**Boiler UNI – Certificate of warranty**

Boiler serial number ..... Boiler output.....

User (surname, first name).....

Address (street, city, postcode).....

.....

Telephone/fax .....

Boiler meets the following requirements:

ČSN EN -5: Boilers for central heating systems – Part 5: Central heating solid fuel boiler with manual or automatic fuel supply and maximum nominal output of 300 kW – terminology, requirements, testing and marking.

Manufacturer provides the following warranty:

- Boiler: 24 months since the date of putting the product into operation; 30 months at most since the date of dispatching from the manufacturing plant.
- Boiler drum: 5 years since the date of dispatching from the manufacturing plant.

Conditions for the warranty validity:

- Boiler installation and putting into operation must be performed according to “Boiler installation and operating instructions” by a specialized installation company.
- Removal of defects must be executed by a specialized service organization.
- Completeness of the boiler delivery is guaranteed by the manufacturer.

This certificate of warranty is not valid if submitted blank.

User's confirmations:

- The user confirms that the boiler has been adjusted by a specialized installation company and did not show any defect during the heating test.
- The user confirms to have received “Boiler installation and operating instructions” together with properly executed Certificate of warranty and Certificate of quality.
- The user confirms to have been acquainted with the boiler operation and maintenance.

.....  
Dispatch date.....  
Manufacturer's stamp.....  
Checked by (signature).....  
Date of installation and putting  
into operation.....  
Installation company  
(stamp, signature).....  
User's signature

